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MODERN METHODS
FOR
TEACHERS

A TWENTIETH CENTURY HAND-BOOK
FOR AMERICAN TEACHERS, NORMAL
SCHOOLS, AND TEACHERS'
READING CIRCLES

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PREFACE

Modern methods of teaching are an evolution, a development whose roots reach back into the distant past of Greece and Rome and farther, too. Until the art of printing by movable type was invented by Gutenberg in 1456, teaching was mainly oral. Authoritative statement on the part of the teacher and mechanical repetition on the part of the pupil were the most convenient steps of the teaching process. When this process was reinforced by interrogation, it was more to test the memory than to exercise the understanding; for, in those despotic centuries, self-assertion, individuality, originality in thinking, were crimes against established institutions.

Although Pythagoras, the philosopher of Crotona, was a Greek, and therefore the promise of redemption for individuality in thought, he had failed to emancipate himself from Orientalism in his methods.

Socrates was the first Greek teacher who proposed to make his disciples think for themselves. The method which he employed did not begin with statements on the part of himself and end with repetition on the part of his disciples. On the contrary, he began with what the learner knew, ascertaining this through questions. Then, by means of other questions, he would force the person questioned to think the necessary consequence of earlier admissions. After that, earlier and later conclusions were compared. In this way he would force the person questioned either to contradict himself at last or to reach conclusions that could not be refuted. In so far as Socrates paved the learner's way by causing him to think the new through the old, his method was the promise of modern apperception; in so far as he taught principles through comparison of experiences, his method was inductive. It is also true that Socrates had the captivating personality so desirable in teachers, but even he, if we may judge from the evidence at hand, did not have so much as the slightest inkling of the intricate complications of instruction as a consequence of native instincts, motor correlations, habit, adolescence, and the rest. Comparatively slight as Socratic innovations were, the world which he somewhat shaped could not follow him, and more than twenty centuries passed before the Oriental spirit lost its final hold on Western methods.

In the meantime, not to speak of the Roman Quintilian's keen anticipation, a greater than Pythagoras and Socrates had come and gone—Jesus Christ. What has since become ideal in the methods of instruction was divinely illustrated in the methods used by Christ. The most delicate application of the principles of apperceptive correlations in assignments and lessons was easy for him who "knew man and needed not that anyone should tell him." Divinely cognizant of all that biology and genetic psychology have lately helped us see, he could appeal unerringly to the child's initiative in selecting stimuli and directing responses. Assuming, as he seems to have done, that education is the promotion of that natural evolution of man which fits him for his destinies as shaped by his needs and foreshadowed by his capabilities, he selected courses and methods unerringly. Christ's methods of teaching ushered the world into its modern forms, but not at once. Before his methods could become universally acceptable the world had to acquire at least some likeness to Christ in mental attitude toward man and life and nature.

It was not until the self-emancipating and philanthropic spirit of the sixteenth century religious Reformation had swept over Europe that methods of teaching began to be reformed and perfected in earnest. From that time on, through such Christ-like men as Comenius, Pestalozzi, and Froebel, until now, man and nature have been subjected to the processes of science. With the final coming of biology and genetic psychology, the methods of the educational reformers have gradually assumed their modern shapes.

The bridge has been broken behind us; we could not return to the past if we would, and we would not if we could; for the modern teacher, like modern method, is an evolution. The modern teacher is the product of the centuries of progress behind him,—the heir of the past it is true, but the child of the complex, ever-shifting, intense present. We can hardly guess what this heir of all the ages will make of the future.

Trusting that his efforts may be helpful, the writer dedicates this little book on modern methods to modern teachers.

Respectfully,

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PART I

PRINCIPLES OF TEACHING

Facts are stepping-stones to principles. To know the laws of matter and of mind is to understand the past and to see the future. Results can then be produced or avoided, almost as we please, as soon as we also know how to set the necessary causes into motion. Such " knowledge is power," indeed. Such truth sets us free by making man the master both of himself and of the forces in the universe.

MODERN METHODS FOR TEACHERS

CHAPTER I

THE NATURE OF EDUCATION

Capability in General

The normal child is endowed with capabilities of body and mind that make him very promising "raw material" for the modern teacher.

Body.—Subject, of course, to the limits of individuality as shaped by parentage and environment, even the ordinary child is capable of wonderful development in health and strength, or skill of hand and foot. The results obtained in special schools for physical culture, manual training, and the like, are striking illustrations of the physical perfections of which boys and girls are capable.

Mind.—Although the mental possibilities of different individuals are very different, ranging as they do from deficiency to genius (Thorndike 68, Rosenkranz 107), and although mental greatness in some spheres of mental action depends upon such physical perfections as health and strength ("Biography of Great Men"), nevertheless the development of which the average mind is capable is simply amazing. A great multitude of boys and girls are able to master not only high school and college courses but the harder courses of the university, and every now and then a real philosopher appears in the rank and file. These facts, when interpreted, mean that the average individual in our schools can be taught to think mathematics, science, language, art, etc.

Instinct, emotion, and habit have very much to do with mental possibilities and probabilities. Such instincts as curiosity, play, imitation, motor expression, and competition, serve as powerful incentives to the necessary exercise of human capabilities. Many of the heart's choicest emotions, such as joy, love, and hope, ally themselves with and reinforce the instincts as incentives.

Probably the most hopeful and at the same time the most dangerous tendency in human development is the tendency to do again, as if by inner impulse, what we have repeatedly been doing (James' "Talks to Teachers," pages 45–63).

Habit.—The tendency to repeat, by acquired impulse, what we have repeatedly been doing physically or mentally, is called "habit," from the Latin "habeo," I have, or possess. All customary acts of the body and the mind, such as modes of speech or thought, rapidly become habits. With an impressive start, with caution against lapses, and with brave persistence in eager pursuit of high ideals, almost any beneficial habit, such as truthfulness, can be perfected, and almost any injurious habit, such as impulsiveness, can be conquered. Among the results which invariably arise in connection with the repetitions which produce a habit are ease, speed, skill, momentum, regularity, and interest, in the order just submitted. After a certain amount of practice the correct pronunciation of an English word, for example, becomes easy, *i.e.*, the word is pronounced with less effort. More practice brings speed, *i.e.*, it shortens the time of the act in question. With additional practice comes the power to pronounce the word not only quickly but well. By and by the correct pronunciation of the word becomes an acquired impulse, a second nature. And then this second nature asserts itself as regularly as a clock. Finally that which was hard and awkward and ugly at first becomes a real pleasure. (James' "Talks to Teachers," 64–78.)

The General Principles of Education

The natural development of man, coupled with life's limitations, manifestly determines all obligations and the principles that govern us in performing these obligations.

The Natural Development of Man.—The development of any human being from infancy to maturity resembles very much the development of the race from infancy to its maturity. The stages of development for both are infancy, childhood, youth, and maturity. (1) The savage is the infant of a race, struggling for physical existence and tribal foothold. He must hunt and fish for food, he must fight the beasts about him and has human foes. The weaker tribe must often perish in the conflict with the stronger one. The corresponding period in the life of individuals is also physical, formative, and preparatory. The food process is fundamental, and the struggle with cold and heat and sicknesses and perils often ends in tragedy. (2) The second or childhood stage in racial developments is a physical extension coupled with institutional beginnings. Home-life, social life, government, religion, etc., become somewhat organized. Personal childhood is a race-like extension, the senses and locomotive powers ripening rapidly, coupled with hungry mental life and rapid civilization. (3) A young nation is a racial youth. This youth of a race becomes self-conscious, attains to self-government, and reconstructs its institutional life. Personal youth is a revolution: self-hood begins to assert its claims, ideals undergo tremendous changes, and individuality ripens and expands very rapidly. (4) Unless inhibited, nationality ripens into imperialism. In this stage the nation assumes the responsibility of imparting its acquisitions to humanity, ambitiously projects itself into international affairs, and undertakes to shape centuries. The fully ripened individual resembles this ripened nationality. The man who remains too small to impart the riches of a ripened life to the world and to the century of which he is a part is hardly fully man. In short, *the race-line is the life-line of its individuals.* The thought is very fundamental.

The Obligations of Education.—*The race-line should be broken and shortened in personal development.* (1) The claims of the body-life of children deserve profound attention and respect. These are the claims of the race upon its individuals. Education should not depart too violently from the race-claims of the body-life of children, nor should it crowd the mental life too rapidly upon the body-claims. The child should not be railroaded too rapidly out of his world of things into a world of books. (2) When, however, the body has had a fair chance to get a good start in all its functions and its parts, there should be a rapid extension of the mental life into all the heritage of the race to which the child belongs. In this second stage of life, let us say between the age of ten and sixteen, the race-line should be purposely shortened by books, schools, etc., but without violating body-claims. It is nonsense in a life so short as ours to expect boys and girls to repeat slavishly and slowly the steps of the centuries in science, literature, art, etc. The richer the racial heritage, the greater are the responsibilities of the nation to its boys and girls. Then, too, the environment of the young should be utilized to redeem them from the grip of evil ancestry. When evil ancestry projects itself through generations, as it does, transplantation from inferior to superior environment will modify consumption, conquer certain forms of insanity, and overcome heredity in morals. To attempt less than this for individuals is to fall short of possibilities and to bring nations into disrepute. Moreover, worthy individuality, or worthy personal difference, should be allowed to triumph over race-uniformity. The remarkable differences in our capabilities suggest difference of mission and destiny. Those who are responsible have no right to ignore these suggestions. (3) We should reverence the pause that often ushers in adolescence. This is Nature's imperative. A multitude of boys and girls are buried alive on the threshold of adolescence by teachers who do not understand the race-claims on early youth. (4) The revolutionary reconstruction of adolescence, or youth, should be reverently, wisely supervised. In this period God has given us the opportunity as teachers to save boys and girls from the moral tragedy of completely broken race-claims. It is here that we may help to shape the personality of boys and girls by keeping hold of their confidence long enough to give them a Pisgah view of life beyond the school. This guardianship over the self-expansion and the self-extension of a young life is the most imperative dictate of reason.

Definition of Education.—As a consequence of the shortness of time to which the process of education must be confined, we can not hope to develop all the capabilities with which nature has endowed us. Moreover, local and temporal necessities largely determine which capabilities should be developed. Accordingly, although allowance must be made for these limitations, ideally (I) *education is that promotion of the natural evolution of man which fits him for his destinies as shaped by his needs and foreshadowed by his capabilities.*

The term " education " is derived from the Latin *e,* out, *duco,* I lead, and *tion,* the act of. In education, as in civilization, there must be somebody who selects stimuli in the light of ideals, and urges protégés by means of these stimuli to act along the lines of destiny, thus preventing the consequences of blind obedience to impulse and caprice. (See O'Shea's "Education as Adjustment," and Spencer's "Education.")

Certain pertinent questions arise from this general statement of the problem of education. To what extent does education depend upon the pupil himself? Why is a teacher needed? What are the ultimate objects of education? What species of education are possible? The important truths involved in the answers to these questions are termed Principles, from the Latin word *princeps,* meaning leader; and, because these principles resolve themselves into special principles, they are also called General, from the Latin *genus,* meaning a larger class capable of subdivisions.

Self-Activity.—The interest which the pupil takes in his lessons, the attention which he pays to instruction, the efforts which he makes to master set tasks, especially the setting up of tasks with distant ends in view and their accomplishment,—all forms of self-help in education are conveniently termed self-activity. The highest form of self-activity consists of efforts purposely put forth to attain ideals. Capacity for such self-activity sharply distinguishes normal man from other animals. The normal child unknowingly begins his own education in play, but must knowingly complete it in work.

PLAY.—In play the essential motive is the pleasure which it affords, as in skating or croquet. But the full worth of play is not to be measured by the pleasure which it affords. Play, as Froebel so clearly perceived, develops individuality, or self-assertion, through its essential freedom of action; and, as the instinctive exercise of body-parts and mental capabilities at their ripening times, play greatly promotes health, growth, and strength both of body and of mind.

WORK.—In work the essential motive is not the pleasure which it may or may not afford, but some ulterior object such as duty or utility, as in thinking hard or chopping wood. Because work eliminates caprice from action, and subordinates pleasure to duty or utility, it is the necessary complement to play in the development of a perfect individuality. While entertainment, change of occupation, leisure, and the like, preserve spontaneity of individuality and "keep the bow from snapping" in the strenuosity of modern school life, work in the shape of reasonable compulsions, such as hard studies and necessary rules, is indispensable as discipline for real life.

Summing up, we may say that (II) *self-activity in the form of play and work, or their equivalents, is the basis of education.*

Supervision.—At first, and in many instances for a long time, pupils can not estimate their present powers accurately nor foresee just what they should become by and by; they do not know what to do, why, nor how. This being the case, they will waste their energies, lose their way, and may give up in despair or confusion. For these reasons pupils need the supervision of somebody who knows them individually, the supervision of somebody with correct ideals, who is authorized to decide what should be done, somebody who shall provide the needed stimuli, direct the responses, remove limitations, and thus in due time enable them to get on without him. In short, (III) *effective supervision is the necessary supplement of self-activity in education.* Just how the modern teacher endeavors to accomplish his tasks, is to be explained in the paragraphs that follow.

ASSIGNMENTS.—Among the items to be considered in assignments to pupils are the difficulty of the task to be performed, the present ability of the pupils, their probable mental attitude toward the task assigned, the teacher's ability to find the stimuli needed to win the active consent of pupils in question, the amount of time at the disposal of pupils in the preparation of tasks assigned, the local environment of the study periods, the possibilities of the recitation periods, the probable effects which the responses required of pupils in the performance of assigned tasks will have on their individual development, and the suitability of the assignments themselves as means to ends in the larger processes of education.

STIMULI.—For younger pupils, as child study shows, motor-expression is the most effective stimulus. In other words, the child instinctively loves to do something, to act his ideas, to express with his body, hands, feet, or tongue, what he thinks, feels, and wills. Branches like reading, drawing, writing, spelling, singing, and the like, become very fascinating to children through appeals to this instinct because we thus add a play-quality to work. Illustrations, too, are interesting for the same reason, and also because, as we shall see in Chapter III, the abstract can be understood only through the concrete. To motor-expression and illustrations as stimuli for younger pupils we must add imitation and competition, both of them often serving as stimuli to motor-expression and supplementing play-pleasure, as we see in class work. In as much as the instincts of imitation and competition serve important purposes all through life, the teacher should not only use these instincts as school incentives, but also strive to make the former intelligent and the latter unselfish. With proper precautions the love of esteem becomes a powerful school incentive. In many boys and girls the moral sense ripens early, and serves as an effective stimulus.

When the reasoning instinct begins to monopolize the pupil's mind, as it normally does in early adolescence, books as well as things become fascinating, but like work and play the two should not be separated very far. When love of books ripens slowly and late, we may look for other abnormal delays in development. Early adolescence, accordingly, is usually the best epoch in life for branches like arithmetic, grammar, languages, and the like. In this period ripening individuality is somewhat equivalent to pugnacity, for which reason the conquest of difficulties becomes very attractive. The modern teacher will not overlook this opportunity.

However, what most pupils need most as a stimulus is a teacher. The mere fact that pupils are expected to report to the teacher in the recitation serves as a stimulus.

The effect is magnified by the fact that in the recitation his mind unites with theirs in lesson attacks. The sympathetic, lovable, and really superior teacher, is an incomparable stimulus.

EMANCIPATION.—The great purpose of modern teachers is to emancipate the pupil, *i.e.,* to help the pupil to help himself more and more until he needs no more help from others in his own development. The pupil must therefore be put into the best possible physical condition, obstructions which are really insurmountable to him must be removed, he must learn to think by means of books and how to use his mental capabilities, and in the crises of his natural development his personality must be shaped by superior personality.

In view of the intimate relations of the body and the mind, the pupil's general health should be promoted; special care should be taken of his eyes, ears, nose, and throat; in his study hours he should be protected from distractions and annoyances in surroundings; that time of the day in which it is easiest to command the kind of attention we most need in the recitation of any branch is, of course, to be used for that recitation; and the school room should be made a physical delight (Kirkpatrick's "Fundamentals of Child Study").

When the learner comes to a "dead halt" in a lesson, the modern way to remove obstructions, *i.e.,* to help the pupil help himself, is to pave the way for him by means of reviews, suggestive illustrations, pertinent questions, hints, etc., rather than by doing for him what we could get him to do for himself. This procedure is technically called apperception, as we shall learn more fully in Chapter V, and is always more professional than direct instruction except in such cases where apperceptive instruction is either impossible or an unreasonable waste of time. (See Quick's "Educational Reformers," page 224, and Hinsdale's "Art of Study," page 226.)

It takes long to teach the pupil to read, *i.e.,* to think by means of books, but the more effectively this task is accomplished the more complete is the pupil's educational emancipation. This ability enables him to think between recitations, at home, and after he must leave school; it becomes possible for him to think the thoughts of the masters, and thus to make himself an heir of the ages in science, language, literature, philosophy, etc. From this view-point supplementary reading books and school libraries become startlingly important. Through judicious "supplementary readers" reading usually becomes a pleasure and through school libraries a habit. After that the "graduate" is more likely to collect a home library and to consult public libraries in his post-graduate life. To emancipate the pupil in science studies, such as biology, we must not only teach him to think by means of books but by means of experiments. He must be taught to find the materials needed in experiments, how to study specimens, how to discover likeness or law by comparing specimens, how to record discovered facts and conclusions, and how to apply the results to useful purposes in life. If in addition to the power to read and investigate for himself the pupil also acquires enough motor education for his practical needs, his educational emancipation is pretty complete.

There are well defined epochs in the normal development of boys and girls, as we shall learn more fully in Chapter II. The teaching process must be more or less specially adapted to each of these natural epochs, while the abnormal developments and monopolies more or less frequently ushered in with these epochs make the teaching process very hard. The modern teacher must not only be "on the lookout" for these epochs and the possible surprises coming with them, but he must be fully prepared to do the right thing at the right time. He must deal very patiently, for example, with defectives, dullards, and delinquents. He must make a special study of every adolescent, *i.e.,* of every pupil in the later "teens." When he finds "adolescent pause" he must wait on Nature in his school requirements, and when he finds "adolescent stress," *i.e.,* a pugnacious or rebellious individuality, he must try his utmost to command respect through superior training and to dominate over such individuality only by superior personality and inspiring ideals. The teacher who can adapt himself to these epoch difficulties will have large graduating classes. (See "Hall's Adolescence," Vol. II, page 554.)

Briefly stated (IV) *the pupil's emancipation must be gradually effected through the stimulations and instructions of superiors.* And the superiority must, of course, be commensurate with the tasks involved.

Ultimate Objects and Proximate Aims.—The ultimate or final purposes of education will, of course, determine proximate or nearer aims.

From the strong desire to be happy now and hereafter and the startling multitude of God's provisions for such happiness (see Lübbock's "Pleasures of Life"), we infer that happiness is one of the attributes of the life complete which God has planned for us.

God, as moral science and experience teach, has made it possible for man to know the right from the wrong, and to choose for ourselves in life. From this, and from God's holiness, as we learn of it in Nature and Holy Writ, we must infer that He will hold us responsible. This inference is confirmed by the fact that we can not be truly happy unless we try to be truly good, and still more by the well-nigh universal faith in immortality. Thus goodness is to be an attribute of life complete.

The world in which we live makes it necessary for the great majority of men and women to do something or other for a living, to contribute something to the sustenance of those who can not help themselves, and something to the betterment of the world at large. We must try to fit ourselves for various occupations, trades, positions, and professions. Those who fail in these requirements fall behind in life's rugged ways, become a burden to society, or perchance, betray the holy ties that bind them to loved ones and to society at large—the community, the church, the state. Thus usefulness in some shape or other is to be an attribute of the life complete (see Dewey's "School and Society").

If education is an evolutionary, *i.e.,* a completing process, as defined on page 15, the ultimate objects of education must evidently be identical with the ends of life complete as planned for us by God. Accordingly, (V) *the ultimate objects of education are happiness, goodness, and usefulness.* Any system of education that ignores these purposes either in its processes or consequences is, to say the least, very incomplete.

School Aims.—The special aims of education—school aims, as we may call them—must, of course, be subordinate to the final aims as means to ends. All those forms of physical and mental development, or culture, which help us live completely are among the worthy school aims. Some of these are health of body and mind, strength enough to work hard with mind and body, skill enough in mechanical or artistic manipulations, a multitude of good habits and worthy interests. With culture must be combined, if possible, such knowledge of nature, God, and man, as serves the ends of life as planned by God (see Thorndike's "Principles of Education," pages 3–6, and the N. E. A. Report of 1903, pages 46–54).

Species of Education.—The number of man's powers and the ends to be kept in view in the cultivation of these powers, determine the possible species of education.

Physical education has to do with the body; it aims to make the body a fit abode and instrument of the mind. As a means to these ends a training in physiology, physical culture, and mechanic arts is indispensable.

Intellectual education has to do with the thinking and knowing powers of the mind; it aims to develop these powers into fit instruments of life. As a means to this end, both general and special courses of study are necessary.

Moral education has to do with building character, *i.e.*, with will training into subordination to ideals of utility, beauty, duty, and religion. The corresponding sub-species of moral education are termed practical, æsthetic, ethical, and religious. As means to these ends of moral education the pupil needs to be trained in the useful arts and sciences, in æsthetics and the fine arts, in personal and social virtues, and in religion. Religion as a most effective stimulus in moral education, and because it brings the soul into personal relations with God, is the highest form of education. All species of moral education begin with intellect, and the corresponding emotions, or mental feelings, thus waked up solicit the will. And all these activities combined into conduct constitute the moral life of man (see Rosenkranz's "Philosophy of Education," and MacCunn's "The Making of Character").

Supplementary Reading.

1. The Teacher's Motives. Horace Mann, N. E. A. Report, 1858.
2. Child Study. G. Stanlay Hall, N. E. A. Report, 1894.
3. The Cultivated Man. C. W. Eliot, N. E. A. Report, 1903.
4. The Making of a Teacher. Brumbaugh, Philadelphia, 1905.
5. Principles of Teaching. Thorndike, New York, 1906.
6. Aspects of Child Life and Education. Hall, Boston, 1907.
7. A Broader Elementary Education. Gordy. Publishers, Hinds & Noble.
8. The Ideal School. Search. Publisher, Appleton.
9. Talks on Psychology and Life's Ideals. James. Publisher, Henry Holt.
10. Education as Adjustment. O'Shea.
11. Fundamentals of Child Study. Kirkpatrick.

CHAPTER II

MIND

It must be evident enough to any one who observes himself in the concrete, that thinking, feeling, and willing are not physical phenomena, *i.e.,* phenomena of matter. In other words, it is not our body that thinks, feels, and wills; it is the "self" whom we call "I," which self is also known as mind, soul, spirit. Although in most intimate junction with the body in which it dwells and which it employs, the mind, notwithstanding certain statements to the contrary, is not really the "function" of the body, but a distinct entity that itself has functions.

Mental Functions, or Faculties.—The acts of which the mind is capable are known as mental functions, while the capabilities themselves are termed mental faculties. Although we should never think of the mind as having separable parts like a watch, the acts of which the mind is capable can be classified for convenience. On the basis of most fundamental distinctions, fully set forth by psychologists, we may classify the mental faculties, as has commonly been done, under intellect, sensibility, and will, hereby denoting respectively thinking, feeling, and willing faculties. (See Dr. Deatrick's "The Human Mind and Its Physical Basis.")

Intellect.—The intellectual acts of which the mind is capable, classified on the basis of the "stuff" upon which the mind can make attacks in thinking, *i.e.,* in arriving at ideas and relating them, are as follows: (1) perception, the act of thinking the sensible present, as in looking at a rose, (2) memory, the act of thinking the past again, as in recognizing faces, (3) imagination, the act of thinking combinations that merely resemble sensible experience, as in reading novels or in dreaming, (4) judgment, the act of thinking likeness or unlikeness by direct comparison, as estimating length or weight by sight, (5) reasoning, the act of thinking relations and their consequences, as in arguments that end in the discovery of causes, laws, and effects, and (6) self-consciousness, the act of thinking the present experiences of the mind as self.

Some of the faculties just defined have special names when specially employed. The intellectual phase of conscience, sometimes called the "moral sense," is judgment employed in thinking the morally good or bad; the intellectual phase of taste, sometimes called the æsthetic sense, is judgment employed in thinking the beautiful or ugly. The judging and reasoning capacities are jointly termed the power of thought, or understanding. The term "Reason" is used to denote the mental capability of thinking true relations.

Sensibility.—The feelings of which the mind is capable are termed Emotions, from the Latin *e,* out, and *moveo,* I move, while the capability itself is termed Sensibility, or Heart. The emotions have been variously classified by psychologists to suit special purposes. The following classification serves the purpose of the present chapter: (1) the simple emotions, *i.e.,* states of mental pleasure or pain of whose cause the mind may not be consciously aware, as cheerfulness or melancholy; (2) affections, *i.e.,* the states of being mentally moved toward others, as in friendship or enmity. To distinguish these mental movements toward other persons from the simple, or subjective, or egoistic emotions, they are often termed objective emotions, and may be either benevolent or malevolent. (3) The third class of emotions are the desires, *i.e.,* the mental demand of that which pleases us, as in avarice, ambition, etc. Desire for things which produce pleasant sensations, as food when we are hungry, is termed appetite. Desires which, like jealousy, amount to suffering, or sweep us from our voluntary moorings, are termed passions. The feeling of value to which the mind is moved by certain sensible impressions, is termed interest, as when we hear a lovely voice. Our native interests are termed instincts, among which are the pleasures which novelty, play, imitation, motor-expression, competition, acquisition, hope, etc., afford. (4) The fourth class of emotions are termed expectations, like hope, *i.e.*, desires coupled with faith in their attainment. Expectation coupled with opposition is termed fear.

Will.—The ability to determine mentally what shall take place is termed will, and any exercise of will is termed willing, or volition, as when we decide to study a lesson. The decision is the end of the voluntary struggle between alternatives, as when after long hesitation between two possible courses of action we choose the useful rather than the easy course. Stimuli which provoke voluntary struggle between possible courses of action, but which do not fatally determine our decision, are termed motives, as when a man gives up cigarettes in spite of the temptation to continue. Attention and intention are the most important forms of voluntary action. Attention is the voluntary selection of one object of thought to the exclusion of all others. Intention is the present decision to attend to something future. Intention promotes attention, as we see in boys who cherish high ambitions.

Principles of Culture

It is possible, as experiments show, to *promote* the development of which the pupil is capable. In other words, the pupil can be quickened, strengthened, and otherwise perfected in his actions. These desirable results, as well as the process through which they must be effected, are termed culture, and the laws to which the mind in its development is subject are known as principles of culture.

Exercise.—Practice quickens the pianist's movements, strengthens the blacksmith's arm, perfects the athlete's muscles. "Practice," as we say, "makes perfect." Exercise in thinking makes the thinker quicker in his line of thinking, exercise in cheerfulness makes cheerfulness much easier, practice in attention to details of any kind improves the power to attend to such details most amazingly.

Natural development is retarded by inactivity, as in the case of idleness. Although young swallows caged until the time when ordinarily the flying instinct should have become less clamorous fly as well when released as others, the fact that cave fishes have only rudimentary eyes and the strange case of Caspar Hauser seem to show that capabilities wholly deprived of exercise are not only retarded but finally lost. This is certainly largely true of acquired strength, skill, habits, interests, etc.

A multitude of facts like those enumerated force us to conclude that (I) *the appropriate exercise of any capability promotes its development.* The universality, *i.e.,* relative absence of exceptions to this law, startlingly emphasizes the importance of observing it.

The Exact Effects of Exercise.—It has been found by specialists that practice in remembering one kind of facts, such as names, does not also improve us to the same degree for facts of another sort, such as faces; that practice in judging the size of surfaces of one shape does not also equally improve us in judging surfaces of other shapes; that practice in one kind of reasoning, as mathematics, does not also equally improve reasoning in other lines, as grammar; that the accuracy which pupils acquire in school work, as in penmanship or spelling, will not always extend itself to tasks outside of school; etc. The reason is not far to seek, namely, the unlikeness of the data upon which the faculty is set to work. The organs of the body, like the mental faculties, obey this law to a surprising extent.

On the other hand, exercise in adding, as we all know, does not only perfect the ability to add, but also the ability to multiply, because multiplication is largely addition. The translating power which comes from the study of Latin is a help in learning French because many of the facts learned in the former are needed in the latter. In general, educated men and women have immense advantages simply because the tasks which they mastered in the process of their education were so much like those of real life.

Summing up the two sides we may briefly say that (II) *the likeness of the data upon which a faculty is exercised determines the likeness of effect.* In view of this law the importance of thoroughly adapting the curriculum of schools can hardly be overestimated.

CORRELATION OF FACULTIES.—Observing teachers know not only that the organs of the body, take the heart for example, can be strengthened and perfected easiest when supported by related organs like the kidneys, but also that the senses improve more rapidly when reinforced by attention, as in object lessons; that a better sort of memory results from exercise for which comparison paves the way, as in mastering declensions; that high attainments in reasoning depend upon the strong support of imagination, as in geometry; that splendid growth in sensibility is impossible apart from intellect; and that a far more perfect type of will can be developed in connection with emotional intensity, as in working out ambitions. Facts like these go to show that (III) *to develop any faculty completely the exercise must be reinforced by related faculties.* To fall into the hands of a teacher who can not effect these necessary correlations is a calamity.

NATURAL ORDER.—In early life, as Lukens, Ricci, and other scientists teach us, blind instincts and individual impulses tend to substitute themselves for the logical order of thinking. Surprising and apparently evil tendencies break the line of upward progress. Intellectual and moral aptitudes apparently safe from relapse suddenly grow paralyzed. A period of physical and mental "pause," probably for preparation, as Dr. Ellis shows, precedes the mighty adolescent upheaval which, as Dr. Stanley Hall and others show, is probably the greater birthday of maturity. Even the ordinary "rate of growth" in aptitudes is somewhat variable, as observing teachers know.

In spite of these irregularities, the natural order of development is fairly constant. Intellectually we ripen first in perception, followed in order by memory, imagination, judgment, reasoning, and self-consciousness. Influenced very much by heredity and experience, the emotions ripen from the sensuous to the ideal, and the impulsive will of childhood to the rationality of manhood.

Investigation tends to show that (IV) *the ripening time is the best time for developing a faculty.* The hunger of early childhood for facts of all descriptions, the delight of early youth in fiction, the ease with which geometry is mastered in the early "teens," the late arriving enthusiasm for psychology, and a multitude of familiar facts, proves the generality of this law. It is therefore of the utmost importance to supply each ripening faculty with abundant data in the curriculum for effective exercise. With the subsidence of the hungry instincts that herald forth the ripening time of every faculty, the greater possibilities of the faculty are lost.

THE LIMITS OF DEVELOPMENT.—Although exercise promotes it can not create. In other words, (V) *the possibilities of development are limited by individuality, i.e.,* by the "I" as a special personality, influenced by heredity and experience.

The difference is often startling, as we saw in Chapter I. Some can reason better, some are capable of splendid emotions, some are giants in volition. Some of us are, therefore, "philosophers born," or poets, artists, orators, conquerors. Nations, too, have an individuality. Greece excelled in fine arts, Rome in making laws, Germany in deep philosophy, England in empire building, America in developing of resources. Centuries of subjection injured the possibilities of the Chinese and the Negro. The great task of modern education is to ascertain individual possibilities and develop them up to the limits.

Supplementary Reading.

1. Principles of Teaching. Thorndike. Seiler.

CHAPTER III

KNOWLEDGE

WHATEVER it may be, mental or otherwise, upon which the mind is intent in thinking—*i.e.,* in arriving at ideas or mental representatives, and their relation—is termed an "object of thought," as hope, roses, conclusions about earthquakes, etc. To be in accord in what we think with the object of thought, is to "know," or to have "knowledge," as when in thinking of hope, roses, conclusions, etc., we are not mistaken as to their nature and the results. Accordingly, knowledge consists (1) of ideas that are true to an "object of thought," and (2) of thoughts, *i.e.,* of comparisons in which some idea is predicated of another, as when we mentally affirm—and not mistakenly—that Venus is a planet, or that mignonettes are not violets. As illustrated in these examples, thoughts in which the mind is not mistaken are termed "truths." A "particular" truth, or "fact," is a truth with regard to individuals, as Many boys go to college. A "general truth," or "principle," is a truth about a genus, *i.e.,* all related individuals, as All robins are birds. The technical or special term used for knowledge resulting from exact examination of individuals, their relation, and the consequence of their relation, is "science," from the Latin *scire,* to know. One mark of the modern teacher is the purpose to promote exact or scientific knowledge. He must therefore fully understand the steps of the scientific process and the results.

The Psychology of Science

When subjected to analysis the scientific process resolves itself into three distinct steps, namely, observation, induction, and deduction.

Observation.—(1) In scientific or complete observation, individuals, or specimens of a class, like areas, plovers, "I's," are analyzed into parts to discover attributes and actions. Individuals like plants, or parts of individuals like colors, are combined to discover consequences which otherwise might never have been known, as in chemistry. The facts thus discovered are recorded, as when we say "These mother robins carefully fed their offspring," "This I can think, feel, and will." (2) The examination of individuals which ends in discovery of facts, is followed by detection of identity, or likeness,—if there is any,—between the examined individuals. This identity may be one of attribute, as when we find that "These roses are fragrant," or one of relation, as when we find that the proportion between two algebraic quantities is that of two to one.

Induction.—The discovery of identity, or likeness, between individuals is followed by the most startling mental act of which we can conceive, namely, the conclusion that what is true of examined individuals of a class like roses, areas, or I's, is probably true of most or all individuals of the class, whether we can ever examine them or not, as when we say All roses grow on bushes, The area of all triangles is equal to the base multiplied by one-half the altitude, All I's can think, feel, and will. Such generic, or class conclusions, usually termed hypotheses, must, of course, often be verified by further observations, as in the case of Newton's falling apples, and the verifying process, as we shall see presently, is deduction. The whole process of coming to generic conclusions is termed Induction, from the Latin *in,* into, and *duco,* I lead.

Perhaps the inductive impulse, universal as it seems to be, is really instinctive. Whether this be true or not, the likeness between individuals of any class in Nature is so extensive that perfect individuals commonly represent the class. In as much, however, as this "uniformity of Nature" is not without exceptions, the conclusions of induction, even if they be based upon extensive observation, must be accepted very cautiously, as in all the empirical, or experimental sciences.

The generic conclusions to which induction leads are technically termed Principles. These principles are sometimes termed definitions, sometimes laws, etc. When a principle is the description of a class it is termed a Definition, as in telling what an island or noun is. A mode of procedure which is found to be convenient in performing all the tasks of a class is termed a Rule, as in Arithmetic or society. The invariable behavior of a cause is termed a Law, as, Water flows down hill.

Deduction.—The final mental step of science, termed "deduction," from the Latin *de,* from, and *duco,* is capable of great exactness, provided certain "laws of logic" are obeyed. Deduction is the assumption that whatever is true of a class of individuals must be true, in a measure at least, of included but not examined individuals in question, as when we argue that if all water consists of hydrogen and oxygen, *this* drop of water must consist of these elements. Some sciences, as mathematics, are more largely deductive and therefore easier, while most of the sciences are more largely inductive and therefore harder, as we shall see in the section on Principles of Knowledge.

Definition of Science.—*In process science consists of observation, induction, and deduction; the results are facts, principles, and inclusions.* In short, science is classified knowledge.

Syllogisms.—Both induction and deduction can be technically stated in the form of arguments termed Syllogisms, from the Greek *σύν* together, and *λογίζομαι* I reason. As an illustration of inductive syllogisms, take (1) These grapes grow on vines, (2) These grapes are like all grapes, (3) All grapes grow on vines. As an illustration of deductive syllogisms take (1) All animals need water, (2) This mouse is an animal, (3) This mouse needs water.

The first two judgments of a syllogism are termed premises, from the Latin *pre,* before, and *mitto,* I send. The relation of likeness between the individuals of the first and second premises is denoted by a "middle," or repeated term, as "these grapes" in the inductive and "animal" in the deductive syllogisms.

Classification of the Sciences

There are, of course, as many sciences as there are classes of individuals to which the process of science can be applied, but, broadly speaking there are three and only three classes of sciences. This conclusion is based on the fact that, so far as we know, there are three and only three fundamentally distinct "objects of thought," namely, (1) matter as quantity, (2) matter as subject to forces, and (3) mind.

Mathematics.—The science of quantity is termed Mathematics, from the Greek μαθεῖν, to learn. The primary subdivisions of mathematics are Geometry, the science of form; Arithmetic, the science of numbers; Algebra, the science of equations. There are many special subdivisions.

Natural Sciences.—The sciences concerned with the forces to which matter is subject "by Nature" are termed the Natural Sciences.

PHYSICAL SCIENCES.—The natural sciences concerned with forces other than life itself are termed Physical Sciences. The primary subdivisions of the physical sciences are Physics, the science of molecular forces; Chemistry, the science of atomic forces; Mineralogy, the science of mineral formations; Geology, the science of the earth's formation; and Astronomy, the science of the heavenly bodies.

BIOLOGICAL SCIENCES.—The sciences concerned with life in corporeal organisms are termed Biological Sciences, or simply Biology, from the Greek βίος, life, and λόγος, science. The primary subdivisions of biology are Botany, the science of plant life; Zoölogy, the science of animal life; and Physiology, the science of the animal life of man.

Geography, the science of the earth as the home of man, is to a very great extent an eclectic science, its subjects of study being found in various domains of nature and history.

Mental Sciences. — The sciences concerned with mind and mental action are termed Mental Sciences. The primary subdivisions of mental science are Psychology, the science of mental phenomena; Logic, the science of the "True"; Æsthetics, the science of the "Beautiful"; Ethics, the science of the "Good"; and History, the science of "Events."

LANGUAGE.—The words, sentences, and discourse by means of which we express what we think, feel, and will, are termed Language. The application of the science process to the various aspects of language gives rise to many special sciences such as reading, writing, spelling, grammar, rhetoric, etc. Writings whose form and content are of permanent and universal interest are technically known as Literature.

ART.—The physical construction of knowledge is termed Art. Thus we speak of the arts of writing, drawing, music, painting, architecture, printing, agriculture, etc. Those arts whose chief end is Beauty are termed Fine Arts, as music and sculpture. Those arts whose chief end is Utility are termed Useful Arts, as agriculture and manufacturing.

PHILOSOPHY.—Master minds of all ages have tried to arrive at the ultimate principles of the physical and moral universe. In these attempts it was often found necessary to criticise both the methods and the conclusions of the various sciences. This critical inquiry into the possibility, certainty, and limits of knowledge, is termed Philosophy.

THEOLOGY.—The science of God is termed Theology. Theology is properly classified as a mental science, but may employ all others. Natural Theology attempts to know God through Nature as his work. Revealed Theology approaches God through the Holy Scriptures. Religion is theology in the concrete.

Principles of Knowledge

The laws according to which knowledge develops in the mind, are termed Principles of Knowledge. These principles are ascertained by inquiry into the *constitution* of knowledge.

Ideas and Names.—The reader of this page may not know the names of some parts of the pair of scissors on the table before him, and yet be quite familiar with the qualities and uses of those parts. The difficulty of finding words to express certain ideas is a common experience. In the natural course of things names are quite unnecessary in forming ideas, and are subsequently added to ideas to record and communicate them. The possibility of writing, speaking, and spelling words before their meaning are known, is only an apparent exception to the law exhibited in the foregoing collection of facts; in such cases of spelling, etc., words are simply so many sounds, marks, etc., and not really names or signs or symbols of ideas. Thus we infer that (I) *ideas precede names and signs.* In accordance with this principle new words should generally be introduced in connection with the objects, qualities, actions, and ideas of which they are the names. The rule should be: The idea first, and then the name. The violation of this simple law has many penalties.

Concrete and Abstract Ideas.—Our first idea of such qualities as redness, hardness, gratitude, etc., came to us in connection with beings that were red, hard, grateful, etc., *i.e.,* they were direct experiences, and are therefore termed Concrete. The act of mentally drawing the qualities of things from their Concrete or objective connections, is termed Abstraction, from the Latin *ab,* away, and *traho,* I draw, as when the mind is intent on rose fragrance to the neglect, for the time being, of the rose as an object. The resulting quality-ideas are termed Abstract Ideas. In other words, (II) *concrete ideas precede abstract ideas,* the former being necessary mental stepping stones to the latter. It is possible, of course to have approximately correct ideas of qualities that were never experienced in the concrete, provided that these ideas are products of synthesis, analysis, etc., of other experiences. In such cases, however, the ideas at which the mind arrives are likely to be vague and even false. According to this principle the first duty of instruction is to develop such concrete ideas as the pupil's mind shall need in order to think desired abstract ideas, and the second duty is to transform the concrete ideas into the desired abstract ideas. In this process the pupil should not be hurried beyond his capability, nor should he be allowed to remain too long in the concrete. In the first case confusion will result; in the second, intellectual shortage. Since, as we shall see, perfect abstraction is indispensable to generalization, *i.e.,* thinking genus ideas, the principle just stated, and its requirements, are among the most important things in the problem of education.

Particular and General Ideas.—Our first knowledge of oranges, friends, etc., was a knowledge of experienced individuals. A cumulative mental synthesis resulted from subsequent abstractions, and we grew more and more accustomed to think of oranges, friends, etc., in classes. This cumulative process is termed Conception, from the Latin *con,* together, and *capio,* I take, or Generalization, from the Latin *genus,* class. When the individuals rather than the mental process is emphasized in our attention, conception or generalization is termed Classification. In short, (III) *particular ideas, or percepts, precede general ideas, or concepts.* According to this principle the development of general ideas, which, as the psychology of science shows, is very important in our education, requires thorough observation of individuals that represent the genus. Careful observation must, however, be supplemented by equally careful induction as means to ends.

Ideas and Truths.—In the sentence expression of a judgment, or thought, at least one idea must be predicated of at least one other idea, as when we say The rose is a plant. In other words, thoughts are made up of ideas as materials. To put it in another way, (IV) *ideas precede truths, i.e.,* thoughts in which the mind is not mistaken. According to this principle those ideas which must be presupposed in the formation of any judgment, or thought, should be developed before the attempt is made to form the judgment in question. The violation of this principle has brought innumerable woes to pupils in reading, arithmetic, grammar, geometry, etc.

Facts and Principles.—Particular truths, or facts, as explained in the psychology of science, are the truths at which the mind arrives through examination of individuals, as, These apples grew on trees. In as much as such examination of individuals must always precede the comparison through which the mind arrives at general truths or principles, it is obvious that (V) *particular truths, or facts, precede general truths, or principles,* as when we compare the apples which we examine and find so much likeness that we jump at the generic conclusion that, All apples grow on trees. Such generic conclusions, or principles, are of vast importance to life, because they aid us in the comprehension and management of practical details. They should therefore be as free from error as possible. To make sure of these results in teaching, we should safeguard both the observation which prepares for comparison of individuals and also the comparison itself.

Order of Facts of Sciences.—The facts with which the inductions of mathematics and natural science begin, as, The circumference of these circles is 3.1416 times the diameter, and, These pears are heart-shaped, are both ascertained through perceptive observation, and the ability to succeed in such observation is not difficult to develop. On the other hand, the facts with which the inductions of mental science begin, as, The mind of these boys responds readily to auditory stimuli, can often be ascertained only through elaborate tests, and the ability to succeed in such observation depends not only upon maturity of self-consciousness but also upon special training. Thus we conclude that (VI) *the facts of mathematics and natural science precede the facts of mental science.* According to this principle elementary instruction should begin with object lessons correlated with motor-expression in numbers, reading, writing, spelling, etc.

Order of Principles of Sciences.—The great generic truths, or principles of mathematics were known to the ancients. The natural sciences have only lately begun to mature in generic thought. Some of the mental sciences are even now only in their infancy. This order stands out as the law of the sciences, and may be stated as follows: (VII) *the principles of mathematics precede the principles of natural and mental sciences.* The relation of the sciences makes this order a logical necessity; (1) The natural sciences cannot be completely developed without higher mathematics, and (2) generic conclusions in many departments of mental science presuppose a thorough knowledge of mathematics and natural science. That this really is the natural order of arriving at generic conclusions in the sciences appears especially from the fact that the second premise of mathematical induction contains nothing gratuitous, whereas that of the natural and the mental sciences does. This gratuitous factor is most difficult to deal with in the mental sciences. According to this principle of knowledge mathematics should be made fundamental in higher education. Although logic is a mental science, it should be taken up as special preparation for systematic thinking in higher natural science. A course in physics, chemistry, biology, etc., should precede systematic inquiry into the higher mental sciences.

Causes, Laws, and Classes.—The reader will remember that among the earliest interests of his mind was the interest in *causes,* or powers. The questions which children ask along this line are legion. *Laws, i.e.,* the invariable behavior of causes, is probably the most common subsequent interest. In other words, adults as well as children do not only desire to know why a thing exists in the form in which it does exist but also whether it will always be so. Thus, for example, they wish to know why the Autumn leaves fall, and then whether they will fall every Autumn. The desire to group individuals on the ground of essential resemblances and differences generally follows interest in causes and laws. It is true that the habit of grouping objects and events on the ground of sensible and practical resemblances and differences may be developed very early in life, but such convenient classification ignores cause and law as essential bases of division. That the natural order of inquiry into causes, laws, and *scientific* classes, is the one just presented, is plainly confirmed by the fact that "the ancients early made inquiries after the causes in natural philosophy and astronomy, while the attempts to ascertain the laws is of much more recent date," and by the fact that "the scientific classifications of Natural History are much more recent than those of Natural Philosophy, Astronomy, etc." Thus we find that ordinarily (VIII) *the mind seeks causes first, then laws, and scientific classes last.* In other words, invariability in the behavior of a cause can be known only by comparing the behavior of that cause under varying conditions, and scientific classes, as in botany and zoölogy, can be formed only when both the cause and laws to which the individuals are subject are known beforehand. There are cases, however, where the law will present itself to the mind before the cause, as in gravity, and the class before the laws and causes, as when mental action is broadly classified into thinking, feeling, and willing. To be in harmony with the principle enunciated in this paragraph it is best, as a rule, to develop causes and laws together, classes being taken up somewhat later. This has become the rule, for example, in taking up history and physics before biology.

Science and Philosophy. — As a search after ultimate generic conclusions, philosophy obviously presupposes not only cyclopædic acquaintance with the conclusions of science in all its special problems, but also extensive acquaintance with psychology and the logic of the sciences. In other words, (IX) *the sciences precede philosophy.* According to this principle of knowledge, philosophy should not only come last in the college course, but a thorough college course should prepare the way.

Correlation of the Sciences. — It was with joy that Froebel first perceived the relation of many apparently unrelated "objects of thought." Herbart, "the Königsburg philosopher," pursued the subject extensively. The great truth in question is this, that we can always prepare for one mental conquest by another in the fields of knowledge. This apperceptive connection of knowledge, as it has been called, is termed Correlation, and is so extensive that the mind cannot go very far into any science without arriving in the fields of all the others. In short, (X) *all the sciences are correlates.* The "group" system and the "eclectic" courses offered in a number of colleges is a recognition of the principle involved. According to this principle the "daily programme" of all grades of schools should bring the pupil into daily contact with the whole field of knowledge. The principle reaches its limits in the university, where, after a general course, the student may wish to make some field of knowledge a specialty, but even this special course cannot be pursued to the best advantage unless the student has passed through a correlated general course. The principle of correlation also finds its limits in the technical and professional schools, where it must often be abandoned for practical and economic reasons.

Courses of Studies

Courses of study for modern schools must be in harmony with the principles enunciated, as was indicated under each one separately. Accordingly, the course must be determined (1) by the ultimate objects of education, (2) by the stages of ability to which pupils may attain in succession, (3) by the natural order in the development of knowledge, and (4) especially by the requirements of apperception in the progressive correlation of subjects assigned for study.

Ultimate Objects. — Among the studies that make for happiness in modern life are nature study, literature, fine art, and philosophy. For goodness the course should include not only literature and Nature, but history, ethics, and religion. In the interests of usefulness all sorts of courses in motor-education, mathematics, language, science, and the useful arts, are needed. The great professions and the schools which prepare for special vocations dictate courses for themselves.

Stages of Ability.—(1) A number of the conditions that determine the assignment of lessons, such as the time which the pupil has at his command, etc., determine what may be included in a course of study. (2) The special culture-effects at which we should aim in promoting the natural evolution of the pupil's capabilities determine, as has been explained in the chapter on Culture, what subjects of study should be emphasized at the high tide of possibilities in mental development. (3) The available stimuli to which the teacher can appeal in the successive stages of the pupil's development, as explained, help to determine what may be included in the course.

Apperceptive Order.—The natural precedence of ideas, thoughts, sciences, etc., as fully explained in this chapter under the section on Principles of Knowledge, determines the order in which topics, lessons, and fields of work should be taken up. When this progressive correlation is perfect the pupil is prepared for every new mental conquest by the most appropriate preparatory conquests. This has become known as the "apperception" requirement in courses of study.

Construction of Courses. — Among the best modern efforts to construct courses of study in harmony with the principles enunciated are (1) The "Report of the Committee of Fifteen" on courses for elementary schools, (2) The "Report of the Committee on Secondary Education in Pennsylvania," (3) The "Report of the Committee of Ten" on College Entrance Requirements, and (4) The "Report of the Committee of Seven" on Higher Education.

Supplementary Reading.

1. Educational Review, Nov., 1895; Feb., 1893; April, 1897.

CHAPTER IV

PRINCIPLES OF INSTRUCTION

The term instruction, from the Latin *in,* into, and *struo,* I build, denotes the teaching process so far as it has to do with promoting the acquisition of ideas, thoughts, opinion, knowledge. We shall probably never be able to dispense wholly with direct information in dealing with learners, and yet ideal instruction must be causative rather than communicative, *i.e.,* the process of instruction must consist of assignments, stimuli, and supervision rather than of telling, stating, imparting, etc. To cause the learner to think is the distinctive purpose of modern instruction (see Self-Activity and Supervision, Chapter I). The desire to know more, the habit of study, right methods of study, etc., are vastly more important to the school boy than the information which a recitation may enable him to acquire. In other words, the culture which the pupil gets from the learning process is among the highest tests of fine instruction. In order that the teacher may attain to these ideals he must conform with certain laws, to which, as psychology shows, the mind is subject in the knowledge-getting process. The general truths here in question are termed Principles of Instruction.

Adaptation of Lessons.—The work to be performed in the mastery of lessons may consist of ascertaining and representing facts, or the discovery and application of relations by means of comparisons. If the assigned acquisition of facts is beyond the present possibilities of the learner, if the comparisons to be made are too complex, if the required mental concentration is too prolonged and severe, the learner may lose faith both in himself and in his teacher. If, on the contrary, the tasks assigned do not tax the learner up to the limits of his present possibilities, he will soon grow lax in effort and lose inspiration. Therefore, in assigning lessons and making promotions the modern teacher must consider first of all the difficulty of the task to be performed with books as tools or by means of things, and then the present possibilities of the learner in view of his age, health, talents, habits, previous advantages, etc., together with the time at the pupil's disposal in the preparation of his tasks, the local environment of the study periods, and the physiological and economic possibilities of the recitation periods. In short, (I) *the learner's present possibilities ought to be considered in assigning lessons.* To be in full accord with this principle the teacher must study the lesson which he expects to assign, think it into the necessary mental steps which the learner must take to master it, and, after carefully considering the present possibilities of the pupil or the class, adjust the assignment to the possibilities. In view of these requirements it is not surprising that the untrained teacher often fails to reach desirable results.

Succession of Lessons.—The "royal road" in teaching perceptions, conceptions, inductions, and deductions, is through the related known to the new, and from the simple to the complex. This, as already explained, is apperception, and requires that lessons to be studied should, if possible, be approached through others that pave the way. In short, (II) *the apperceptive relation of subjects ought to be considered in assigning lessons.* According to this principle the modern teacher must try to ascertain just what the pupil knows, and then lead up to that knowledge for which the knowledge already acquired is the necessary preparation, as when we teach operations with fractions after operations with whole numbers, and decimal fractions after common fractions. In geometry, for example, the progress from theorem to theorem must be a somewhat perfect junction of syllogisms, each one paving the way for the next one and necessitating it. In any study some steps will not be possible for the learner until he has taken all the steps that lead up to the one in question. After the same fashion, geography prepares the way for history, and arithmetic for algebra; but geography does not prepare the way for algebra, nor arithmetic for history. In short the various branches of study, as well as the various steps of a branch, should precede and follow each other in the order in which by relation to each other they prepare for each other.

Interesting Lessons. — It is almost impossible, especially for younger boys and girls, to study lessons that are not interesting in themselves or that have no obvious connection with things that are interesting in themselves. The will, as psychology shows, is most active along the lines of intense interest. Interesting lines of thought are almost irresistible, as any one can testify. That lesson which is most interesting is most likely to be studied. And such a lesson becomes not only a possession of the memory, but also an easy conquest of the understanding, and a permanent consequence to character. Therefore, even if, contrary to the arguments of the Herbartians, it is really possible and highly necessary to acquire the power to apply the mind to disagreeable tasks, in order to be able to succeed in life, (III) *the possibility of interesting the learner ought to be considered in assigning lessons.* This possibility is really much greater than one might suppose. Lessons that have to do with the sensible in nature, with the beautiful in any sphere, with causal and novel relations, with human joys and sorrows, with concern for communities and nations, and the like, are interesting in themselves to the normal mind. It is true, as genetic psychology shows, that these native interests, permanent and universal as they seem to be, are somewhat modified by ancestry, environment, individuality, sex, age, and ideals; but, when the lessons are well adjusted to the present powers of the learner, and the succession of the lessons is thoroughly apperceptive, these interests can always be relied upon as effective stimuli.

Then, too, lessons which are not interesting in themselves become interesting, as explained in Chapter I, through appeals to the instincts of motor expression, imitation, competition, success, esteem, duty, etc. The ability to turn these "borrowed interests" to good use is a distinguishing characteristic of the modern teacher.

Needed Lessons.—The possibility of interesting the learner is, however, not the only reason, nor even the best reason, for assigning any lesson. There should always be some obvious connection between the lesson to be studied and the ultimate objects of education. Genetic psychology shows that, as a rule, those lessons which make for perfection in culture, for success higher up in the grades, and for success and moral perfection in life, also appeal to the learner at the times when they must usually be taken up in school. For this reason the Herbatians insist on interest as the safest and most significant reason for the assignment of any lesson. This "soft pedagogy," as it is sometimes called, is not as sane as hard experience could wish it to be. Experience shows that caprice and love of ease often stand between the pupil and his highest good, as in the mastery of multiplication tables, necessary mathematical formulas, abstract texts, etc. In such cases the teacher should appeal to the pupil's instinctive desire to conquer difficulties. Failing in this appeal, he cannot be charged with the crime of pedagogical despotism if he resorts to argumentative insistence and rational compulsion. In short, (IV) *all the pupil's needs ought to be considered in assigning lessons.* Among the serious questions which the modern teacher must decide in accordance with these requirements are the following: (1) With which of the many possible objects of sense should the senses of the pupil be occupied? (2) With which of the many possible conquests should the pupil's memory be burdened? (3) Upon which of the many possible materials should the imagination operate? (4) From what possible mass of experiences should the mind cull its concepts? (5) Within which of the many practical, moral, and religious domains should the understanding try to cognize relations?

Right Method of Instruction. — In its attempts to understand the world and itself, the mind finds only wholes, parts, individuals, and genera. Thus, however, a number of operations become possible. We may pass from the whole to its parts, as with words and sentences; from parts to the whole, as in sentence construction and addition; from the concrete to the abstract, as in teaching qualities of wholes or parts; from the abstract to the concrete, as in reading and algebra; from the simple to the complex, as in teaching geographical wholes and grammatical classifications; from the individual to the genus, as in teaching definitions and laws; from the genus to the individuals, as in using rules or obeying laws; from practice to theory, as in explaining processes and justifying courses of action; and from theory to practice, as in the application of science and philosophy to the tasks of life. All these possible mental processes resolve themselves into analysis, the reduction of a whole to its parts; synthesis, the construction of parts into wholes; induction, the discovery of relation or genus by comparing individuals; and deduction, the treatment of individuals by inclusion in a genus. Which of these steps the learner must be required to take, and how many of them, depends upon the knowledge with which he starts out. In other words, (V) *the right method of instruction is analysis, synthesis, induction, or deduction, as determined by the mental situation.* It is difficult to understand how any one fit to be a teacher could fail in these requirements, and yet that is just what has happened frequently from the times of Socrates until now in teaching abstractions, conceptions, definitions, laws, problems, etc. The one thing needful in deciding on the step which the pupil is to take is to ascertain the mental situation and to act accordingly.

RIGHT FACULTIES.—(1) In the final analysis all studies resolve themselves into mental acts, as was explained in the psychology of science. Some faculties are of much more importance to success in any study than others, because of the "stuff," or subject matter, which is attacked. In spelling, for example, associative memory is more important than inductive reasoning, while in geometry deductive reasoning is more important than associative memory. The differences, as analytic psychology shows, are really startling. (2) In any study success depends most upon the order in which, according to the stuff, the faculties are called into service. The natural approach of the pupil to the stuff of geography, for example, is from the near to the far through perception followed by imagination. In the study of events through books the imagination must be largely substituted for perception, because the stuff is in the past or far away. In short, (VI) *the method of instruction is right when the learner is led to use the right mental faculties.* To be in full accord with this requirement the teacher must not only analyze the lesson or branch in question into the mental steps of which it consists, but he must call the necessary faculties into service in right order, and lay the burden where it belongs by nature. In view of these truths, the old-time classification of studies into "information studies" and "thought studies" was a pedagogical crime.

Right Use of Faculties.—"In learning anything there are two points to be considered, 1st, the advantage we shall find from knowing the subject or having that skill, and 2nd, the effect which the study of that subject or practising for that skill will have on the mind or body." The latter consideration, as was explained in Chapter I, is of primary importance in education. But it does not follow that a course of instruction, even if it employs the faculties which ought to be employed, improves those faculties sufficiently. And this failure is due to improper employment of the faculties in question. When, for example, the senses are not required to be used with interest and attention, or the memory work is only mechanical, or judgment goes unchallenged, or reasoning is deductive when it should be inductive, the results will, of course, be disappointing. It is only when faculties are properly employed and in proper correlation with other faculties, that they can be sufficiently improved. Accordingly, (VII) *the method of instruction is right when the learner is led to use right faculties rightly.* A very thorough course in educational psychology is the necessary preparation for the teacher who expects to succeed in this requirement.

Emancipative Instruction.—The one overshadowing purpose of school instruction is to make post-graduate self-instruction possible and probable. This, as has been explained in Chapter I, is termed the pupil's emancipation from the teacher, and must be looked upon as the decisive test of right method. In other words, (VIII) *the method of instruction is right when it leads the pupil to self-instruction.* To this end it is not enough to accustom the pupil to analytic and synthetic observation, to well-supported inductions, and to logic-guarded deductions, as required by the psychology of science. Nor is it enough to accustom the pupil to make those approaches and attacks which the stuff of lessons and studies requires, as has been explained in the preceding paragraphs on the use of mental faculties. The learner must also be trained to swallow book-stuff as cautiously as predigested foods, and his own inductions in the laboratory must be the most guarded conclusions based upon abundant and well-examined data. He must, moreover, be accustomed to emotional intensity without emotional storm, and to voluntary isolation from disturbing environment. Apart from these conditions, concentration, the most essential attribute of successful study, is quite impossible. To pupils thus prepared to help themselves study will become an absolute delight—a joy forever. These desirable results, however, cannot be attained in a day even by the best teachers with the best pupils. The best we can do is to set up the ideal and pursue it with ardor. Even the poorest results will be marvellous.

SPECIAL METHODS OF INSTRUCTION.—Institutions undertaking to prepare students for special vocations, such as the ministry, medicine, law, teaching, banking, commerce, engineering, etc., must of course be governed both in course and method by the special ends in view. While it is not in harmony with the idea of this treatise to enter extensively into the difficulties of such situations, passing reference is required. In some of these technical, or special schools,—take medical colleges or the laboratory of the university specialist for example,—all the steps of science should, by reason of the tremendous responsibilities that must rest upon the graduates of such institutions, be required in faultless perfection. In other schools, take theological seminaries or law schools for example, where books and lectures must be largely used, the student should be especially exercised in mental digestion supported by high ideals. In many special schools, take industrial art schools, academies of fine art, etc., for example, where the controlling idea is either mechanical or æsthetic prefection, stress must be laid on patient accuracy, skill of execution, etc. In short, (IX) *the method of instruction in special schools is right when it is in harmony with special purposes.* A developed pedagogic sense and rich personality are the indispensable prerequisites of teaching power in all such institutions.

COMPLETE METHOD OF INSTRUCTION.—The psychology of science, language, art, philosophy, etc., shows that analytic and synthetic observation, be it personal or substitutional, is the way to study individuals, and thus to ascertain facts; that induction or comparison of individuals is the road to all generic conclusions or principles, such as definitions, laws, etc.; and that the only other thing which the mind can do is to apply such principles to the solution of special cases under the rule, this final step being deduction.

That is to say, that all study-tasks resolve themselves into these steps, and the series exhausts all the possibilities of the mind. It is only fair to insist that whenever it is possible without violating economic ideals observation should at once be followed by induction, and induction by deduction, as in teaching spelling, definitions, drainage, wars, and the like. In short, (X) *the method of instruction is complete when observation is followed by induction and deduction.* It is really pathetic to see how frequently this principle is violated not only by the untrained but by the trained teacher.

Supplementary Reading.

1. General Method. McMurray.
2. Recitation. Hamilton.

PART II

METHODS OF CULTURE

What the writer hopes to express has been summed up by the poet—

> “He lives most who thinks most,
> Feels the noblest,
> Acts the best.”

While the perfect life is known to psychology by laborious analysis, it is known beforehand to the poet by a sort of inspiration.

CHAPTER I

METHODS OF MENTAL CULTURE

THE NATURE of culture, as explained under Principles of Culture in Chapter II, Part I, determines right methods. The following rules, as the student should try to understand for himself, are derived from the principles in question.

Perception.—When accurate perception in the various important domains of life has become a habit, much has been accomplished. These attainments should therefore be the ends in view in exercises for the senses.

1. *Exercise the senses habitually on forms, colors, parts, qualities, etc.* The house in which we live, the street on which we walk, the various occupations of life, offer many opportunities for such exercise of the senses. The school must lead boys and girls definitely into many proper fields of observation and experiment. Special lessons on selected objects, plants, animals, etc., must be given.

2. *Combine apperception, interest, and voluntary effort with the exercise of the senses.* It is marvellously helpful to pass from the related old to something new in the exercise of the senses, as in lessons on form, colors, plants, animals, etc. Interest sharpens the senses, as in new surroundings like museums, parks, etc. Voluntary effort saves the mind from caprice in the exercise of the senses, as in looking for a friend in a crowd or for the petals of a rose.

3. *Find effective stimuli to compel perfect perception.* Most of the instinctive impulses, such as love of play, imitation, curiosity, competition, and the like can be utilized to compel perfect perception. The desire to return with a charming account of what can be seen, heard, tasted, smelled, felt, etc., in the woods, or the request to write

a good description of a picture to be studied, works like a charm as a stimulus to perfect perception. Accurate perception can often be compelled by requiring pupils to make a picture of things to be observed, as in case of object lessons.

4. *Seize upon the ripening time of the senses for special exercises.* Mental activity begins in the senses. The "little ones" are all ear and eye and hand. This fervent inquisitiveness of childhood, alas, too often ceases when childhood ceases, not only because the hungry soul is not fed, but also because appropriate food is criminally withheld. Accurate perception should become a habit as early as possible in life, for then it will be easy enough for the average person to keep it up until late in life.

5. *Grant the pupil's individuality enough initiative in the use of his senses.* Supervisory power must of course be vested in the teacher, unless the contentions of Chapter I, Part I, are ill-founded, but, as explained in Chapter II, those claims of individuality which are not out of harmony with the ultimate objects of education should be respected. Such claims, as educators well know, come to the surface as early as infancy in decided attitudes of preference for this or that in the sense world. In this, as in other things, "the child is father to the man." In the recognition of the child's individuality the teacher must, however, carefully distinguish between individuality itself and such pathological conditions of the senses as call for the service of skilful oculists, surgeons, physicians, etc.

Memory.—The power to acquire rapidly, to retain faithfully, and to recall quickly, whatever is really worth acquiring, retaining, and recalling in the many domains of life, is among the most valuable attainments of perfect culture. Together with perception, memory is the furnishing and conserving agent of the mind. It should therefore be carefully cultivated. The following rules are submitted as helpful.

1. *Exercise the memory habitually on valuable data in science, language, art, etc.* As already explained in Chapter II, Part I, the power to remember names does not always go with the power to remember faces, etc. Since it is only when there is likeness of data, as in laws of languages, that likeness of effect in the use of the memory follows, data typical of all valuable acquirements in all possible domains of life should be used for memory training. Among the data upon which memory should accordingly be exercised are names and faces, valuable facts and formulas, inspiring extracts of prose and poetry, and the necessary order of succession in the tasks of life.

2. *Combine interest, attention, and thought with the tasks of memory as reinforcements.* (1) As a mental excitement interest makes the memory vigorous in acquisition, as we know from experience in committing pretty extracts or valuable dates. Since interest is also an excitement of the sensorium, which is the present organ of memory, it makes both retention and recollection more certain, as we know from experience and psychology. (2) Voluntary attention quickens acquisition. By reason of the impression of the sensorium attentive acquisition guarantees more perfect retention and quicker recollection, as many of us know from experience with orations and their delivery. (3) It is much easier to commit something in which there is a thought, as the student can prove by first committing a long sentence forward and then another of the same kind backward. In the first case the thought suggests word associations, heightens interest, and invites attention, thus serving the memory in a number of ways. Such natural associations as those of contiguity of time and place, cause and effect, likeness and contrast, are easily explained as thought-effects on memory. Any system of mnemonics not based on thought relations is likely to be a hindrance rather than a help to memory.

3. *Exercise the memory to its utmost at the ripening*

time. In the great majority of cases tested, approximately the first fifteen years of life constitute what has been termed the acquisitive epoch. During this epoch the memory, through the alertness of the senses, due in large part to the novelty of everything, acquires all sorts of data with the greatest ease, with the likelihood of permanent retention and ready recollection. Neglected or abused at this stage, arrest of development, or even decline of power, is almost certain to follow. The lost opportunity can seldom be recovered. Those who, like Agricola, can take up Greek at the age of forty-one and learn to use it with elegance and eloquence are rarely to be found. The method of instruction, as well as the course of instruction in our schools, should be harmonized with this significant law of memory.

4. *Grant the pupil's individuality enough initiative in the use of his memory.* As in the case of the senses, the teacher must be careful not to confound caprice and pathological conditions with the pupil's real individuality of memory. That there are real differences of capacity and mental trend in memory is too well known to require comment. Before these differences the modern teacher will bow with due respect, reserving only the power to harmonize each individuality with the highest possibilities.

Imagination.—A clean, rational, and powerful imagination is so important to the mind and life, as analytic psychology shows, and yet so easily debauched, perverted, and arrested in its development, as pathological psychology shows, that we should devote our best energies to a proper cultivation of this faculty. The following rules should be observed:

1. *Use imagination in as many proper domains as possible.* Among the materials upon which imagination should be exercised in the interests of mind and life may be mentioned (1) persons, places, things, or facts beyond the present scope of the senses, as in geography or history,

(2) the portraits of good literature, (3) the multitude of proved and unproved hypotheses of the various sciences, (4) the creations of the various fine arts, (5) the conceptions of invention, (6) the infinite in time and space, (7) dramatic presentation, (8) etc.

2. *Compel perception, memory, and thought to contribute the necessary data.* In as much as imagination consists of thinking combinations that resemble sensible realities, the cultivation of the senses in the various domains of science, language, art, invention, life, etc., will of course be necessary in the cultivation of imagination within these domains. In so far as memory amounts to reproductive imagination its cultivation, like that of the senses, contributes the necessary "stuff" for productive combinations, or transcendence. And the very "web and woof" of productive imagination often consists of apperceptive thoughts, as in scientific hypotheses, literary portraits, artistic creations, pratical inventions, etc. Accordingly the cultivation of apperceptive thought is of the highest importance in the cultivation of imagination.

3. *Support and control the imagination by reason.* Reason, as we have learned, is the power to think true relations, *i.e.,* it is sanity of thought. The preservation of such sanity through obedience to physiological laws is the only safeguard against capricious and riotous imaginations. The connection in question is evidently of the utmost importance to mind and life.

4. *Promote the development of imagination by the use of proper stimuli.* Among the most powerful stimuli of imagination are curiosity; the beauty of nature, literature, and art; and the desire to achieve something useful or surprising. While curiosity is a most effective stimulus to imagination in the various fields of science, it must be wisely curbed by dictates of morality in the various fields of literature and art. Although the beauty of nature, literature, and art, as a stimulus in the cultivation of imagina-

tion, is somewhat subject to the same limits, the domain of effectiveness is much more extended. The desire to achieve success in literature, art, invention, etc., unless it be commercialized or corrupt in any way, is a most productive stimulus, as biography has proved abundantly.

5. *Exercise the imagination rightly to the utmost capacity in the ripening time.* The ripening time for imagination corresponds rather closely—surprisingly so—with the ripening period of memory, as the life in which the play instinct expresses itself quite clearly shows. In their early years, children should by no means be deprived of playthings and play. In the "teens" boys and girls should still play, but the doors to manual construction, literary and dramatic arts, etc., should be opened to them all as widely and wisely as possible. In that event arrested development and decline is less likely to limit the possibilities of mind and life.

6. *Grant the pupil's individuality enough initiative in the use of imagination.* The teacher should never confound the real individuality of imagination with the defects due to physiological derangement, or to the influence of evil associates and bad books. These defects should of course be corrected by medical treatment, counter-suggestion, or moral restraint, according to the exigency of the case. But, to come right to the heart of the matter, while comprehensiveness of imagination should be cultivated, as already explained, any pronounced preference, be it in favor of science, literature, art, or invention, etc., should be encouraged as much as possible.

Thought.—The term thought, as used in this treatise, denotes judgment and reasoning in all their forms. It is more especially in the sphere of thought that man is superior to the brute, and like unto God. Among the most important things to life and mind, as history shows, are (1) clearness and sanity of judgment on all sorts of subjects, (2) ability to push an argument unerringly to conclusion, whether in a special field or on broader lines, and (3) rapidity of movement where decision demands it. While these things are impossible for the multitude, much can be done for those who will dare to try.

1. *Exercise the judgment much on type-data of science, language, art, philosophy, etc.* If high attainments in one domain of thought were a guarantee of anything like equal ability in others the cultivation of thinking power, in the technical sense, would be comparatively simple, for then we should choose one line of thought, as mathematics, or science, or art, and save time and labor and expense; but this, as explained under Principles of Culture, does not follow. In spite of the overlapping correlations explained in Chapter III, Part I, thought-power, like all other mental power, is highly specialized. Hence the only thing that remains, in order to be equal to the tasks of correlation both in life and mind, is to cultivate thought-power along as many lines as possible. This, of course, makes enrichment of the course of studies in the schools below the university a double necessity.

2. *Support thought by helpful faculties like perception, memory, imagination, will.* Through perception the mind acquires "stuff" for thought, through memory it conserves this stuff. The imagination brings abstract thought within the grasp of the senses, as in the arguments of geometry, and enables thought to transcend realities, as in fiction, where it gives to "airy nothing a local habitation and a name." The will combined with thought tends to make it clear and accurate and rapid.

3. *Always correlate induction with deduction in reasoning.* Induction prepares for deduction, as in learning to spell by rule. However informal it may be, as in the demonstrations of geometry, where the "drawing" stands for it, induction gives authority to deduction. When deduction is omitted, as often happens, and sometimes for good reasons, the cultural correlation is incomplete.

4. *Use the concrete, the abstract, and the difficult in order as stimuli in cultivating thought.* Children like object studies and movements long before they care much for books. And yet, excepting cases of arrested development, the time comes in the early "teens" when boys and girls begin to enjoy books. In the later "teens" and afterwards, unless "soft pedagogy" has spoiled them, the difficult lesson, appealing as it does to the desire to achieve, is a powerful incentive to study.

5. *Exercise thought to its utmost capacity for good in the ripening time.* The reasons for this rule, as the student will know, are the same as before, and important as they are, need not be repeated here. Thought becomes a mental monopoly in the later "teens," as genetic psychology shows, and may continue at high tide for many years, depending of course on physiological supports; but it begins to ripen much earlier than the wild guesses of Rousseau would lead us to believe. The common school branches are the teacher's convenient means in the cultivation of thought not only in the lower but also in the higher grades. Geography, history, arithmetic, and grammar, are best suited to the early "teens." Physical geography, geometry, and algebra, together with botany, natural philosophy, etc., are suitable for high school pupils. General history, biology, psychology, the classics, etc., are useful means in Normal schools and colleges.

6. *Grant the pupil's individuality enough initiative in reasoning.* Apart from physiological limitations, poor opportunities, caprice, etc., there are, as explained in Chapter I, Part I, startling differences of possibility in thought-attainments. As with other mental faculties, comprehensiveness of thought is important to life and mind, but any pronounced preference should be encouraged as much as possible.

Sensibility.—In as much as the emotions are the springs of action in life, the importance of their proper cultivation can hardly be overestimated. A joyous, loving, hopeful attitude should be the end in view. And these attainments are not so much beyond our reach as we sometimes make ourselves believe. The rules to be obeyed are as follows:

1. *Awake worthy emotions by thinking the useful, the true, the beautiful, the good.* The mind is so constituted, as psychology shows, that the character of our thoughts determines the character of our emotions. Improper thoughts generate improper feelings, and proper thoughts, to say the least, tend toward proper feelings. Thus it follows that the "heart" must be cultivated through the "head." To the heart-culture of the perfect life belong all true home affections, all the nobler forms of social chivalry, all the forms of noble civic loyalty, all the forms of love to God. To be right at heart to this extent makes the world in which we live, notwithstanding all its necessary disciplines, a paradise.

2. *Find the required means for the cultivation of emotions in nature, pictures, hymns, persons, books, etc.* Happily there is no lack of means for the cultivation of the mental heart. Nature herself touches this "harp of a thousand strings." It is difficult to understand how any normal mind can come away from the contemplation of Nature without being moved to joy, love, and hope. The painter, the poet, the singer, the literary masters, the inspired writers,—all of these and others have contributed a great deal to the culture of the heart. Home ties, social bonds, religion, and the teacher's personality should count for very much in heart culture. The one warning that must be spoken is the need of wise selection from this wealth of means.

3. *Supply favorable conditions for the natural transition from sensuous to ideal emotions.* The emotions of the child, as genetic psychology shows, are only slightly differentiated from sensation. Ripening thought gradually differentiates emotion from sensation more or less com-

pletely. Unfavorable conditions, such as bad parentage and vicious associations, retard, while the opposite conditions promote the transition from the sensuous to the ideal. Amidst the wealth of means to which attention has been called, the teacher's duty should be very plain. Much can be accomplished by weaving all worthy emotions into life, as Pestalozzi was wont to do at Stanz, thus producing right emotional habit.

4. *Grant the pupil's emotional individuality enough initiative.* Riotous emotion, coupled as it often is with riotous imagination, both of them together arising from disease, etc., must of course not be confounded with emotional individuality. Real emotional individuality is undoubtedly the sequential correlate of intellectual individuality, and, kept subordinate to that comprehensiveness which, as explained, is best for mind and life, it deserves recognition correlate with that accorded to intellectual individuality. Unworthy emotions can often be conquered by counter-suggestion, moral restraints, or medical treatment.

Will.—Apart from intelligent vigor of will, the mind cannot develop adequately nor do its work in the world. Such vigor is hardly among the possibilities of the great multitude, but much can be accomplished by the man or woman of average capability. Marvellous things are possible for a few. The following rules serve the ends in view:

1. *Wake up worthy emotions in worthy domains, thus soliciting the will to worthy endeavors.* As explained under cultivation of the Sensibility, worthy emotions must be waked up by thinking worthy thoughts. Emotions in turn, for such is the law of sequence, solicit the will, and the character of the emotions waked up shapes the character of the voluntary sequence. Experimental psychology and biography both show what Socrates in his theory of morals failed to see, that the sequence of intellectual, emotional, and voluntary activity is not quantitatively inevitable, and

that freedom of will remains in spite of intellectual and emotional trend. But—and this is the point at issue now—CLOSER SEQUENCE CAN REALLY BE CULTIVATED BY EXERCISE, ESPECIALLY BY WEAVING ALL WORTHY EMOTIONS AT FIRST OPPORTUNITY INTO LIFE, AND THIS POSSIBILITY IS THE GREAT HOPE OF EDUCATION.

2. *Make desirable achievements depend for success upon difficult endeavor.* Among the desirable attainments in life are (1) self-perfection, consisting of health, strength, skill, etc., (2) the power for good that belongs to learning, culture, wealth, position, etc., and (3) right personal relations with God through religious morality. The price in voluntary effort to be paid for such desirable attainments is too great for most of us, but much can be accomplished by those who dare to try, as biography abundantly attests. Hard study, coupled with great persistence, leads to great learning. The determination to overcome obstacles and disappointments often brings skill, wealth, and station. The young should be led to see the grandeur of Christian character, and taught to be earnest co-workers with God in building themselves.

3. *Supply favorable conditions for the natural transition from impulsive to deliberative will.* In the child volition, as genetic psychology shows, is only slightly differentiated from emotion. For example, take the conduct of an angry or a thirsty child. Racial childhood is subject to the same law. Ripening thought gradually differentiates volition from emotion more or less completely. Unfavorable conditions, such as bad parentage, vicious associations, retard, while the opposite conditions promote the natural transition from impulsive to deliberate will. The teacher must of course use the same wealth of means advised in waking up worthy emotions. Such instincts as play, motor-expression, imitation, competition, etc., wisely used at right times of life, are also most effective stimuli in the promotion of the transition in question.

4. *Grant the pupil's voluntary individuality enough initiative.* Defective volition, arising from nervousness, loss of hope, etc., must of course not be confounded with real individuality of will. The defect must naturally be corrected by removing the causes. Real individuality, often found in special pursuits, is the sequential correlate of emotional individuality, and, kept subordinate to that well rounded culture which is best for mind and life, it deserves recognition correlate with that accorded to intellectual and emotional individuality. Defective individuality of will can often be corrected by inspiring pupils with a definite ambition, by the contagion of superior personality of the teacher and associates, by the stern realities of life, etc.

Attention.—In the getting of an education, attention as the selection of one object of thought to the exclusion of others is admittedly of supreme importance. Great achievements in life also depend very largely on attention. It is the voluntary phase of attention with which we have to do at this point. The following rules will guide the teacher in securing the pupil's attention and promoting the power to pay attention.

1. *Appeal to the pupil's intellectuality through intellectuality and professional skill.* (1) To command free attention on the part of pupils the teacher must first of all be sufficiently intellectual. A penetrating knowledge of the subject, together with accurate measurement of the pupil in assignments and unmistakable ability to get results, make it easy for the teacher to command attention. Unmistakable ability to get results, however, belongs only to him who is direct in approaching the points to be made, connected and convincing in the argument, absolutely lucid in style, and luminously graphic and illustrative. (2) If to such intellectuality of personality, professional skill is added, *i.e.,* skill in causing perfect observation, perfect induction, and perfect deduction, the teacher's conquest is

well nigh complete. The consciousness of rapid and happy progress under such a teacher makes attention a rapturous delight. Therefore, he who hopes to win the attention of pupils successfully should gladly submit to the rigorous régime of modern professional training.

2. *Command attention through winsome personality.* Authority alone will fail to command attention, but a personality to which, in addition to the larger intellectuality just explained, belong also a larger heart and pronounced manliness, will command attention under almost any circumstances. (1) The teacher of the larger heart is absolutely approachable. The sunshine about him, together with the sense of humor and enthusiasm born of high ideals, are the inviting doorways to his heart. Attention becomes an irresistible tribute of love when the pupils come to recognize in the teacher the belief that he will deal squarely with every pupil, that he will be faithful to the cause of every pupil, and that he will be unfailingly patient with the dull and perverse. (2) The one thing needed most in dealing with the learner as a free being is pronounced manliness. The manly teacher is certain of himself in instruction, clear as to what he wants to teach, confident that he can prove what he wants to prove. He is always self-controlled, master of himself in crises and collisions, immovable where principles are really at stake. He is always morally in earnest, safe in trend, unassailably honorable, touched of God in Christ. Attention commanded by such manliness and largeness of heart is not mechanical and strained, but vital and free. The pupil instinctively recognizes such personality in the bright face, the warm voice, and the devoted vigor of his teacher, and gladly—almost unconsciously—surrenders his soul to the influence.

3. *Make desired achievements depend upon vigorous and persistent attention.* All incentives through which the teacher must appeal to the pupil in the cultivation of a perfect will can be effectively employed in commanding

vigorous and persistent attention, and the teacher should spare no pains to be true to these possibilities. The connection between hard lessons in school and desirable achievements in life is not so difficult to explain as is commonly believed.

4. *Make perfect attention possible through proper physiological and moral conditions.* Among the important physiological supports of attention are proper diet, proper exercise, proper rest and sleep, plenty of fresh air, comfort of body, etc. The teacher should also determine physiologically when pupils should study, what they really can study or recite to advantage at this or that time of the day, under this or that condition of body and mind, how long study periods and recitation periods should be for younger and older pupils, how to avoid abnormal fatigue, etc. A crowded program and impossible tasks are especially pernicious. The teacher should also do his best to prevent the social and moral complications which so often blight the possibilities of boys and girls.

Supplementary Reading.

1. Pedagogical Seminary, December, 1906, December, 1907.
2. Educational Review, April, 1898.
3. Self-Culture. Blackie.
4. School Hygiene. Kotelman.

CHAPTER II

PHYSICAL CULTURE

THE promotion of physical health, strength, skill, and beauty, through special exercise of the voluntary muscles, is technically termed Physical Culture.

The Physiology of Physical Culture

The nature of the body and its relation to the mind, together with the needs of life, will of course determine the special exercises by means of which physical health, strength, skill, and beauty can really be promoted.

The Relation of the Voluntary Muscles.—The vital organs, such as the lungs, the heart, the stomach, the liver, the kidneys, and even the skin, are very intimately dependent on the exercise of the voluntary muscles. This dependence, as physiology shows, is a correlation accomplished by the nervous system ramifying as it does with startling minuteness to all parts of the body, including marrow, bone, hair, and nails. Whatever, therefore, happens to the voluntary muscles is faithfully transmitted to all parts of the body as sympathetic effect. Both neglect and improper exercise are evidently serious.

The Possibilities of Voluntary Muscles.—(1) We can contract many muscles at will. Some muscles are thus shortened while they thicken, as for example the biceps; others carry out the commands of the mind quickly without appreciable change of form, as for example the muscles of the fingers or the eye and its lids. (2) We can also extend many muscles at will. The muscle thus commanded becomes not only longer for the time being but also thinner, like the muscles of the craning neck. (3) In order to be able to extend and contract many of our muscles at will, Nature also gives us the power to determine "the direction" of the movement, as in rotatory neck and body exercises. (4) The opposite of exercise for the voluntary muscles is relaxation, or rest, one of the most important conditions of health, strength, skill, and beauty, a certain interval of rest being absolutely necessary to prevent excessive fatigue and to weave the effects of exercise into the muscle through nutrition. Not the explanation, but the important fact itself, is fully known to observing people in all the occupations of life. Startling as it may be to those who have not thought about it, even relaxation is largely a matter of voluntary decision, as the experiences of those who have tried have found.

FATIGUE.—When the natural resources of an organ of the body, such as the brain or a muscle, have been more or less exhausted, the condition of that organ is called Fatigue. Weariness is the first sign of fatigue. If this warning of Nature is heeded, and the organ is allowed to recover through proper relaxation, such as rest, change, or sleep, no harm results. If, however, the organ in question is compelled to exhaust its natural resources still further, the warning weariness will become painful. When this more serious warning also goes by unheeded, collapse and death must follow. Mental health, strength, skill, and beauty, are so intimately involved in physical fatigue, that education cannot afford to make mistakes.

The Principles of Physical Culture

The ultimate objects of education determine the ends in view in physical culture.

The Ends in View.—As intimated at the outset, *the ends in view in physical culture are health, strength, skill, and beauty.* (1) When all the organs of the body perform their allotted work so effectively that life continues in perfection, the body is said to be healthy. Health, as statistics show, depends especially upon parentage, environment, food, sleep, exercise, clothing, and mental states. Without health as Nature's guarantee, neither life, strength, skill, nor beauty can long be maintained. Health, moreover, has much to do with happiness, goodness, and usefulness. (2) Strength of body enables one to do heavy work and to endure under strain both of mind and body. (3) The ability to move quickly at a moment's notice enables one to save himself or others from impending harm, as in play or work with machinery. The ability to do something not only quickly but perfectly by hand, foot, body, etc., is a valuable accomplishment. (4) Personality with its possibilities for social and moral good makes itself felt largely through the shining eye, the red cheek, the perfect curve, and the graceful motion of health. The teacher applying for a position, the teacher with her pupils, the lady and society, all of us need the beauty which health assures.

The Adaptation of Possibilities.—All the physical excellence that can be attained through exercise of the voluntary muscles must be obtained, as we know from the possibilities explained, through contractions and extensions saved by interspersed relaxations from injurious fatigue, but the *muscular contractions must be adapted to the special ends in view.* Subject of course to the law of habit, exercise consisting even of light contractions and extensions, interspersed with needed relaxations such as rest and sleep, will promote health; regulated combinations of energetic contractions and extensions, with the relaxations that prevent excessive fatigue, will produce, increase, and sustain strength, as in the blacksmith's arm; much practice in rapid contractions and extensions, with the necessary relaxations, will produce agility, dexterity, etc., as in playing ball, making shoes, etc., and continued practice in graceful contractions and extensions will at last produce the grace so much desired. For those, however, who have not started early enough in life, even proper exercise will not do what it does for those who begin in time. Childhood, youth, and manhood, as in mental undertakings, are the hopeful times. Nevertheless, much can be accomplished by those who will try hard and intelligently even after forty.

Correlation of Muscles.—Symmetry and proportion, corresponding somewhat to breadth and inclusiveness in the cultivation of the mental faculties, are desirable physical perfections as elements of beauty and also as marks of health, all-round strength, and skill. The mutual support of all parts of the body, as physiology teaches, promotes the work of each separate organ, and thus adds immensely to health, growth, strength, and beauty. Accordingly, *every muscle of the body should be exercised.* The law of habit makes it important that education should provide for daily correlation in the exercise of the muscles.

Natural Epochs.—Genetic physiology shows that the body, like the mind, develops naturally by epochs. In this development Nature shows favors now to one and then to another part of the body, but never to the detriment of final symmetry and proportion. The defective symmetry and proportion with which we are all acquainted are the results of interference with Nature, as in bad parentage, bad habits, illnesses, etc. When not perverted, Nature, economic in the midst of abundance, as she always is, employs ripening play-instincts to impel us to exercise the different parts of the body somewhat partially at appropriate times in our growing years. With the end of growth instinct gives way to reason. Accordingly, *the hints of ripening Nature should be heeded in selecting exercises for the various parts of the body.* This requirement emphasizes the importance of training in genetic physiology for teachers.

Individuality.—The inclination arising from abnormal conditions of body and mind must not be confounded with real individuality, or preference, in physical activity. Of course, these conditions should be corrected by removing the causes. The problem is more difficult in dealing with the real individuality of pupils. If the inclination toward this or that form of physical activity is natural—a matter of temperament as we say—if it is also in line with worthy ideals of life, it should evidently be encouraged; otherwise, it should be curbed by suggestion, explanation, restraint, etc. In short, *individual initiative should be heeded in selecting exercises for the body.*

The Natural Development of the Body

(1) In childhood, play, the response to instinctive impulse, sufficiently safeguards the interests of physical health, strength, skill, and beauty. As a result of the extraordinary energy of the nutritive organs peculiar to childhood and youth, supported by the enforced relaxations of long sleeping hours, growth of body is coupled with health, strength, skill, etc. (2) In adult life, work in all its various forms as determined by vocation contributes largely to the physical health, strength, etc., of a great majority of men and women. Many abnormal conditions, however, in younger years and in the various vocations of adults seriously handicap the natural development of the body. For this and other reasons based on the relation of the body to the mind and on the needs of life, systems of special exercise for the voluntary muscles are the great necessity.

Courses of Physical Culture

The subjoined courses are based upon the principles of physical culture and adapted to the times and nation to which we belong.

School=Room Exercises.—Unavoidable subordination of the body to the mind in school work tends to damage physical health, strength, skill, and beauty. Play-ground exercises and the exercise obtained on the road to and from school counteract this tendency to some extent, but not wholly. Then, too, these accessories are sometimes wanting. At any rate much can be accomplished especially for health and grace by special training in correct standing, walking, sitting down, getting up, talking, breathing, etc. Among the most charming books on this phase of light and graceful, or Delsarte, physical culture, are the manuals of Mrs. Louise Preece and Mrs. Emily Bishop, published respectively by C. W. Bardeen, Syracuse, N. Y., and B. W. Huebsch, New York.

Play-Ground Exercises.—With the proper precautions walking, running, jumping, leaping, etc., are the right things for the lower limbs. Throwing, lifting, swinging, etc., help the arms. The trunk is effectively involved in these limb movements. The most effective combinations of limb and trunk movements are made necessary in such play-ground games as croquet, tennis, ball, etc. Such games as foot-ball and base-ball are very effective heavy combinations, but should be so governed by rules as to make them much less capable of moral and physical injury. Play-ground exercises can often be supplemented, as in higher institutions, by gymnastic work, basket-ball, skating, swimming, boxing, riding, etc. Those upon whom the burden of organizing classes and teams devolves should have access to Baldwin's and other publications.

Exercises for Busy Indoor Persons.—The best daily physical preparation for students, teachers, etc., is systematic exercise without apparatus. For persons occupied all day long indoor and who can manage to rise an hour before breakfast, the following course is proposed: (1) On getting out of bed drink several glasses of good water to prepare for exercise and to wash the system from within. (2) Take towel bath or tub bath, according to convenience, using cold water as a skin stimulus, etc. Be quick. (3) Stretch all the muscles of the arms and trunk simultaneously by rotatory movements, about twenty-five at first and finally several hundred. (4) Filling and emptying the lungs at pretty nearly the natural intervals but more completely, go through wheel movements with the arms, the hands meeting above the head. (5) Practice low thrusts right and left alternately for the muscles of the heart, digestion, trunk, etc. (6) Practice high forward thrusts with the arms, standing on tip-toes, to exercise simultaneously all the muscles running from the back of the heel to the tips of the fingers. (7) Go through wheel movements with both arms strongly stretched and wheeled alternately, thus exercising many muscles simultaneously. (8) Draw the knees alternately up against the diaphragm for the sake of the organs of digestion. (9) Go through the running movement, but remaining on the same spot. The exercise is meant for the lungs, the heart, digestion, etc. (10) Practice rounding and hardening twirls with arms, neck, etc. Beginners should take these exercises slowly, not too many of each at one time, with "stretch" or effort in all. Anywhere from five to twenty-five minutes of time should be the self-judged limits. Only light-weight underwear and noiseless foot-wear should be worn in these exercises.

Physical Culture Methods

Various preparations must of course be made in order to make physical culture recitations a success.

Preparations for the Physical Culture Recitation.— (1) To begin with, the teacher of physical culture needs as much professional training as he can get. He should also make the most effective preparations for each recitation. He should pass from the simple to the complex, from the related known to the new, from the playful to the rational, in the choice of the recitation tasks. In view of the great possibilities for good or evil in physical culture, the teacher should understand the effects of an exercise on the organs involved before he assigns it or attempts to teach it. The plan of the recitation, its steps and details, should be mastered very definitely. And since, on the part of the pupil, observation must be the first formal step of the recitation, the requisite illustrating skill should be acquired on the part of the teacher. (2) Younger pupils should rarely be required to prepare in any way for the recitation in physical culture. Older pupils should sometimes be required to study explanatory texts, to keep in practice in acquired skills, etc.

The Physical Culture Recitation.—(1) The thing to be done in class should first of all be illustrated, the pupils the meanwhile sharply observing. Explanation must of course accompany or follow the illustration. After the sundry precautions that may be needed by the pupil, the teacher requires the class to imitate his illustrations. With beginners it is perhaps always best to take the leading part in the exercises. He should see to it also that the contractions and extensions have the desired character, such as light effort, energy, grace, etc. An air of business, coupled of course with good mood, should characterize all the teacher's commands. The pupil should cultivate promptness in obeying all commands. If he is required to do so he will in time become master of his body in any impending crisis,—a thing which is seldom true of untrained persons. The relaxations that prevent undue fatigue should of course be interspersed, and the recitation period should not be too long. All wrong individualities should be curbed and corrected. (2) In obedience to the law of habit, the pupils should be required to practise the movements taken up until they can go through them with ease, speed, power, skill, and joy. In other words, the purpose of the recitation in physical culture is not only to exercise the pupil rightly at the time, but also to put him into the habit of taking right exercises in the right way. This work corresponds with induction in the formal steps of instruction, and serves as the pupil's emancipation from the teacher in physical culture. With advanced classes the teacher need not always take part in this drill work after the preparatory illustrations, unless, perchance, he also needs the exercise. (3) The use of acquired habits, as in life, corresponds to deduction in formal instruction.

Value of Physical Culture

The real value of physical culture, as of anything else, decides its right to a place in education.

School-Rooms.—At first thought systematic physical culture seems superfluous in country districts where pupils find many opportunities outside of school hours to develop their bodies, and yet the improper habits of walking, standing, sitting, breathing, etc., which are so alarmingly common in many country schools, call loudly for the corrections that come with good physical culture. In towns and cities systematic physical culture seems indispensable. Opportunities for playing, etc., are harder to find, school grounds are often quite too small, and the out-door hours too few. Enveloped by moral proprieties, both in the personality of the teacher and his requirements, the light and graceful corrective exercises proposed for school-rooms, together with those of the playground, etc., admirably serve the interests of body and mind, not only in the country district, but in towns and cities.

School Athletics.—As educational means the value of such heavy exercise as foot-ball, base-ball, basket-ball, etc., depends almost wholly upon the legislation to which games are subjected, the personnel of the teams, the personality of the trainer, and the moral atmosphere of the school to which the teams may belong. (1) Mass formations, as in foot-ball rushes, make the possibilities of putting star-players out of the game too great, and the risk of life and limb all out of proportion to the value of the things at stake. The appeal to the competitive impulse of young blood is so strong in foot-ball, base-ball, basket-ball, etc., that brute impulse rather than human reason rules supreme too frequently in the crises of defeat and victory. Statistics show that professional athletes die young, not by exception, but as a rule. In those younger years when the athlete is most eager for laurels, the walls of his arteries, being quite elastic, respond readily to the hard-working heart in the shock of crises, but they thicken and grow brittle as a result, thus producing premature "old age" and early death. When the team consists of young men who are coarse in mind and language, or of boys who use cigarettes, strong drink, etc., or of those whose love for show is stronger than ambition to attain to the best ideals of school and life, or of boys who can easily be led to desecrate the Sabbath by public games, or of boys who think loudness of dress and manner is just the thing at home or on trips, the scholastic and moral possibilities of school athletics are quite disheartening. In such cases interest in practice and the prospective games associates those who should seldom be socially together, thus damaging nobler ambitions and character, and injuring the school that tolerates these things. To inter-school competition in athletics this stubborn objection must be added to others, that it taxes the purse, that it consumes much time which certainly belongs to the regular curriculum, that it exposes the team to moral improprieties on trips, that at best only a few of the pupils of a school can participate profitably in the games, and finally that such healthful exercises as croquet, tennis, etc., would practically answer the purpose of the heavier athletic exercises without depriving the boys and girls of the school of important association on the playgrounds. The plea that the lighter exercises, such as croquet and tennis, are too effeminate depends upon definitions in the argument and upon the amount of brain, character, and vigor with which the games are played. (2) In favor of foot-ball, base-ball, basket-ball, etc., as school athletics is to be said, that many of the most objectionable possibilities can be ruled out; that others can be corrected by the personality of the trainer and by sanity in the school as a whole; and that thus guarded the possibilities for good are enormous. When school teams in foot-ball, base-ball, etc., are required to consist of noble-minded boys, freely determined to live up to the best ideals of school and school athletics, when, moreover, all violations of certain rules are punished by expulsion from the team or even from school, these games are marvellously useful in cultivating physical prowess, complex and vigorous coöperation in attaining ends, self-control in crises, graceful submission to defeat, soberness of mind in victory, fellowship of kindred spirits, etc. In a treatise meant for teachers and the friends of the schools both sides of this vexatious argument had to be very fully stated.

Home Exercises.—Persons too much occupied in-doors year in and year out can keep in fine physical condition for many years and live a long life by means of home exercises planned and carried out day after day according to the principles of physical culture. This thought is of special significance in this connection to students and teachers.

The History of Physical Culture.—The esteem in which physical culture has been held has differed very widely in different nations and different centuries. In ancient times the very preservation of nations depended upon physical prowess in personal combat, as in Greece and Rome. Then, too, Greece paid much attention to gymnastics "because the beautiful was worshipped as the highest manifestation of the divine." The ascetic conception that the body was the seat of sin led the Middle Ages, except where chivalry controlled, to despise the body and ignore even its just claims. It was not until Locke's time that educators began to understand the true relation of the body and the mind. The philanthropinists, with Rousseau as spokesman, laid great stress on physical culture as a return to Nature. The "new" education, resting on the clear teachings of Jesus Christ and the conclusions of physiological psychology, has for some years squarely faced the problem of physical culture in our schools. The recent introduction of physiology into the school and the provisions made by Normal schools and special schools like Dr. Sargent's at Harvard for the training of teachers, will do much toward a general and intelligent inclusion of physical culture in the curriculum of schools. The old prejudice against the body is fast disappearing from the minds of the general public, as may be seen in the increased interest of all classes in gymnasiums and field sports. The time is fast approaching when we shall require all teachers to give as much evidence of their fitness to teach physical culture as of their fitness to teach reading and arithmetic. It is to be hoped, however, that the American people may never through over-enthusiasm be content to substitute brute force, animal impulse, or physical vanity for mental conquests and orthodox occupation.

Supplementary Reading.

1. Educational Review, December, 1891.
2. N. E. A. Reports, 1903, 1905, 1906, 1907.
3. Physical Culture Exercises. American Education, Sept., 1906.

PART III

METHODS OF INSTRUCTION

Modern methods of instruction may be labeled thus:—Apperceptive sequence coupled with genetic adaptations.

CHAPTER I

OBJECT LESSONS

OBJECT LESSONS, as the name would indicate, are lessons in which sensible objects are employed.

The Method of Object Lessons.—In order that the lesson may indeed be an "object" lesson the object must first of all be brought within the range of the senses. The minuteness with which an object ought to be examined will of course depend on the purpose of the lesson, together with the ability and interest of the class. The object lesson should not terminate with observation unless a special purpose on the part of the teacher or some inability in the class makes complete instruction inadvisable. Some attempt at complete instruction is especially important for boys and girls whose school opportunities must end before they can take up science in the fuller sense. With beginners and pupils of the lower grades, however, attempts to think the genus and its application should undoubtedly be confined to obvious relations. "Home made" definitions of a form like a circle, for example, or a simple color-law like the synthesis of red and green for yellow, are not only possible but also highly important for the lower grades, while complete definition, scientific classification, complex laws, and their application should be attempted only by those who have the ability to wrestle with such difficulties and by those whose reasons may warrant such attempts. The point where an object lesson in the ordinary acceptation of the term becomes a scientific pursuit both in form and purpose is about as elusive as the rainbow terminus. Nor does it matter much as long as we use common sense in accomplishing our purposes.

Purposes of Object Lessons. — (1) One purpose of object lessons is to know the parts, qualities, and relations of objects, together with the uses to which objects may be put as a consequence of the parts, qualities, and relations. This, for example, may be one purpose in the study of a cylinder, a knife, a rose. (2) Important truths in the world of thought can often be taught most effectively by means of sensible objects, as in case of moral qualities like elasticity of conscience or the fragrance of a personality. In the hands of a knowing teacher object lessons may become marvellously effective apperceptive approaches to the contents of the literary masters and the abstract truths of philosophy. (3) Properly conducted the object lesson is a powerful instrument in the cultivation of perception, judgment, memory, attention, etc. It is this cultural power, coupled with the possibility of broad foundations in the knowledge getting process, that makes the object lesson the method preëminent in the first ten or fifteen years of the child's education.

The History of Object Lessons.—Perhaps there never was a time when object lessons were not regarded as an essential part of primary instruction and apperceptive approach to higher truth. In practice, however, teachers have differed considerably both in purpose and extent of application, this one using the method only for primary instruction, cultural effect, or apperceptive approach to higher truth, that one using it now as an adjunct to other recitations and now as a special period. Although Locke, Comenius, and others advocated object lessons, the credit of introducing them as a distinct method of elementary instruction is usually given to Pestalozzi. The systems introduced by educators of former centuries have, in our days, been expanded and perfected. Modern education lays great stress, for example, on "Nature Studies," often correlated with the study of a literary masterpiece. The Normal schools provide special courses of training in object lessons, and many writers outline systematic courses of work for our schools. Among other suggestive authors are Sheldon, Calkins, Prince, Walker, and Ricks. The probabilities are that object lessons, though sometimes employed amiss, have come to stay. The purposes to which they can be put, as already explained, together with the special values of the various courses, now to be explained, should make this conclusion very evident.

Courses of Object Lessons.—As "stuff" for the cultivation of the senses and other faculties to be allied with the senses in object lessons, the full course should include (1) the significant parts of our sensible environment, (2) the significant forms known to geometry, (3) the dominant colors in Nature and Art, (4) and the most significant habits both of animate and inanimate Nature. The proposed course is also equally important as a contribution to reasonable fitness for ordinary life and as apperceptive preparation for the pursuit of science in the fuller sense. The lessons should begin before the child enters school; they should scarcely end when school years are over, the most interesting objects and the simplest phases coming up for study first, the harder objects coming later and the method ripening completely into science.

Parts of Objects

As a basis upon which to build other special object courses, Object Parts claim attention first.

Course of Lessons on Parts of Objects.—Among the objects in Nature and Art to be used in lessons on "parts" are such as shells, flowers, acorns, oranges, insects, birds, wheels, porch columns, cents, scissors, lead pencils, knives, keys, shoes, chairs, etc. The particular assignments must of course conform with the principles controlling all assignments, and the teacher's preparation for the recitation must be just as complete as resort to "first hand" study guided by helpful text-books, cyclopædias, etc., can make it. The only preparation which younger pupils should make for the recitation is the partnership into which the teacher may see fit to call them in securing needed objects.

The Method of Part Lessons.—By appeal to the analytic instinct, by resort to questions, required drawings or descriptions, and other possible stimuli, the teacher should cause the class to discover all the significant parts of an object. Suppose the object to be a watch. The names should of course be supplied as fast as the pupil needs them, but in strict connection with the parts to which they are to adhere. Drill may be necessary in order to fix the names. So far as possible prior to special instruction the class should be required to think the uses to which discovered parts, like the point of a lead pencil or the handle of a pocket-knife, may be put as a consequence of qualities. Older pupils may be required to consult cyclopædias, etc., to ascertain the history of studied parts. "The Young Folks' Cyclopædia of Common Things," published by Henry Holt and Co., is a most excellent reference book both for teacher and class. Sheldon's "Object Lessons," published by Scribner, Armstrong and Co., and the revised edition of "The Child's Book of Nature" by Hooker, should be in every school room. The one caution here needed is that neither teacher nor class should substitute "second hand" knowledge for knowledge that should be obtained "first hand."

Value of Lessons on Object-Parts.—(1) There is probably no better means of cultivating the habit of *analytic* observation and *practical* thoughtfulness than these lessons on the parts of objects. These lessons also develop the habit of associating *words* and *sentences* with the realities for which they stand in what should always be appended, namely, language work. (2) Analytic knowledge of objects is a *great satisfaction* to most minds, and a mighty stimulus in the formation of the habit of scientific inquiry. (3) The habit of analytic observation and the knowledge thus acquired, are among the best equipments for intelligent achievements in life. Apart from such *equipment,* theory is often fancy and practice full of blunders.

Qualities of Objects

Lessons on the various significant qualities of objects, including form and color, should be associated with the lessons on parts.

Courses of Lessons on Object Forms.—Among the object-qualities to be studied, excluding form and color for the present on account of their peculiar nature, are the many modes of resistance which objects offer to touch, taste, smell, hearing, sight, etc. For example, things are hard, soft, elastic, flexible, ductile, etc., to touch; they are heavy, etc., to the muscular sense; they are pulverable, etc., to force; they are fusible, etc., under changes of temperature, volatile, etc., when pressure is removed. Things are pungent, etc., to taste; aromatic, etc., to the sense of smell; loud, low, etc., to the ear; transparent, etc., to the eye. The succession of assignments, as in Object Parts, must conform with the principles controlling all assignments, and the teacher's preparation for the recitation must be just as complete as resort to first hand study guided by helpful reference books can make it. Pupils may help to secure materials.

The Method of Lessons on Qualities.—By appeal to the serviceable sense-interests, coupled with the teacher's example, needed directions, etc., the teacher should cause the class to experience all significant qualities of objects, minerals, liquids, plants, animals, etc., first hand. The names of the qualities should be firmly knit to the experience, as in the case of object-parts. The pupil should especially be led to discover the uses to which objects or parts of objects, like crayon, salt, roses, bells, glass, etc., can be put just *because* they have these qualities. Language work should of course be combined with these lessons.

Value of Lessons on Qualities.—The study of sensible qualities is the study of the forces present in the world of matter. To know these attributes of environment is to have the necessary key to power.

Form

Special lessons on the significant forms known to geometry should, for reasons already stated, be added to and combined with other object lessons.

Courses of Lessons on Object Forms.—Among the geometrical forms which the purposes of education require to be studied are (1) the various kinds of lines: straight, broken, curved, parallel, oblique; (2) the angles: right, acute, obtuse; (3) the polygons: all kinds of triangles, all kinds of quadrilaterals together with hexagons, heptagons, octagons, nonagons, decagons; (4) the circle with its dozen or more suggestions; (5) all kinds of polyhedrons, such as the three or four kinds of prisms together with the pyramid and its suggestions, the plinth and its suggestions; (6) all sorts of round bodies, such as cylinders, cones, spheres, ovoids, ellipsoids, and the suggestions; (7) conic sections, such as the ellipse, parabola, hyperbola, and the suggestions; (8) complex forms, such as the catenary, spiral, cycloid, etc.

The succession of assignments should be, as it can be, rigidly apperceptive, the above catalogue indicating loosely at least what assignments should succeed each other. The teacher's preparation for the recitation, as before, must be just as complete as first hand study, helpful reference, or special training in geometry and drawing, can make it.

Every school-room should be supplied with a box of geometrical forms. If the teacher cannot make these forms he will probably find a way to secure them by purchase from the Milton Bradley Company, Springfield, Mass., who are ready, for that matter, to supply all the special materials for object lessons. Supplementary objects should be collected by the pupils in accordance with directions.

The Method of Form Lessons.—(1) Children seldom see, hear, etc., all that we want them to see, hear, etc., in object lessons, nor do they bring much natural caution into the required perceptions. In order to cause them to see all the edges of an object in a form lesson exactly the teacher should present the object, say a cylinder, in full view of the class, asking the right questions coupled with suggestive motions, drawings, etc. The name of the form observed must be given in strictest association with the observation of the form. To impress the form facts learned thoroughly the class may be required, under proper directions, to construct the form. Paste-board, soft wood, etc., are convenient materials. (2) At least one larger and one smaller specimen of the form to be taught should be compared with the first one, in order to lead the class to abstract the "form" from the size, etc., of the object used. When the preparatory comparisons have been made correctly the pupils should be required to define the form studied. In older classes the "home made" definitions may be compared with dictionary statements to stimulate exact effort. (3) The pupil should be encouraged to discover many occurrences of the studied form in his environment. This form-analysis of the world usually proves very enjoyable. The pupil should also be led to see why this form rather than that is used in Nature and Art. The power-study of forms will make the pupil inventive and teach him how to help himself in many practical difficulties. The *æsthetic* power of forms should also be carefully explained.

Value of Form Lessons.—(1) The study of form is most excellent exercise for the eye, the judgment, the imagination, the will, etc. (2) A knowledge of forms is essential in the interpretation of the universe as organized for service and beauty. (3) Both the culture and the knowledge obtained in the study of form is an essential equipment in the study of geometry, art, and in practical life.

Color

Lessons on color and its significant phases both in Nature and Art should be connected with other object lessons.

Course of Color Lessons.—Color lessons should begin very early in the life of the child, and the territory to be covered can hardly be covered before college days. Among the significant color-tasks to be taken up are the following:

The Matching of Colors.—The ability to distinguish quickly and without error even the most significant colors in Nature and Art is a most important attainment in any education. The pupil must be assisted in this difficult acquirement by the exercise of "matching" colors, as it is commonly termed. The exercise consists of placing on any convenient surface, say a table, a color not named for the pupil, and requiring him to choose ribbons, etc., from a "color heap," placing the "match" color on the "place" color while lighter and darker varieties of the same color are placed right and left of the place color.

Tests for Color-blindness.—The course of a ship is made known by means of colors on which seamen have agreed. On railroads instructions on which all sorts of important results depend are transmitted in part at least by color signals. Similar services are rendered by systems of color in light-houses, meteorological posts, and even in war. The ability to distinguish significant colors quickly and unerringly is therefore of startling importance. For a large per cent. of the boys and girls that go through our schools this important ability is impossible because of blindness to such significant colors as red, green, etc. These boys and girls, the number of boys subject to this sort of blindness exceeding that of girls, can be sifted out by color matching exercises, and properly advised as to the future.

Language of Colors.—In addition to the conventional significance of certain colors just noticed, many colors have acquired symbolic power, partly based on nature, to excite or express emotions, such as anger, grief, love, humility, etc. To be at home in this symbolic language must be looked upon as quite an accomplishment.

Production of the Solar Spectrum.—According to the now generally accepted Young-Helmholtz theory, conveniently stated for teachers in the Bradley Company "Color in the School-Room," "All color in Nature is contained in sunlight, which is practically white light. When a beam of sunlight, admitted into a darkened room, passes through a glass prism it is spread out like a fan into a band of beautiful colors, beginning at one end with a dark red, which runs into an orange, and then through yellow, green, and blue to violet, which gradually fades away into darkness." This band of colors is termed the *Solar Spectrum*. The production of this solar spectrum is explained as follows: "The beam of sunlight is composed of a great number of different kinds of rays, which in passing through the prism are refracted or bent from their direct course, and some are bent more than others; the red least of all, and the violet most." To account still more fully for the phenomenon, "it is supposed that light is propagated by waves or undulations, in an extremely rare substance termed ether, which is supposed to occupy all space and transparent bodies." The supposed undulatory approach of a sunbeam produces the optic effect of rays, and may be likened to sound waves in the air or ripples on a pond. The pupil who is ready to understand this prismatic experiment will pursue the further study of color with more intelligence and pleasure.

The Mixing of Colors.—"If having a prismatic spectrum thrown on a screen in a dark room we hold two small mirrors in the path of light, one so placed as to receive, for example, the red rays and the other the violet rays, the mirrors may be so moved as to reflect the red and the violet rays on one spot on another screen. The result of this arrangement will be a mingling of the two colors to produce a color between the violet and the red usually called purple. And so we may select any other two colors and thus determine what color is produced by the mingling of *any two or more* spectrum colors. But it is very inconvenient to make such tests, even with the best apparatus and most favorable conditions." It is possible, however, to produce practically the same effects by means of the "color wheel" and the "Maxwell disks." If graduated disks are used, the exact proportion entering into composition may be observed and recorded. Very satisfactory results may be obtained by the use of colored tissue paper, colored crayon, water colors, commercial paints, etc. A knowledge of such color synthesis is of great practical and commercial importance.

THE ANALYSIS OF COLOR COMPOUNDS.—The colors found both in Nature and Art are generally composite colors, as in leaves, flowers, ribbons, etc. By combining and adjusting Mr. Maxwell's graduated disks, and revolving them on a color wheel or spinning them on "tops," it is possible to imitate and thus analyze the color of leaves, ribbons, cloth, etc. Skill in such analysis is not only a great satisfaction, but of practical and commercial importance.

THE DISCOVERY OF COLOR-COMPLEMENTS.—"As white light is the sum of all color, if we take from white light a given color, the remaining color is the *Complement* of the given color. This is a process of subtraction in optic effects, and is accomplished by fatiguing the eye on the given color. When, for example, the eye is fatigued by looking intently for a few seconds at a red spot on a white wall [or red tissue paper placed on a black card in strong light], a faint tint of bluish green is seen." This is the accidental or complementary color of the given red. "Theoretically the complementary of yellow is a very slight violet blue, and of blue an orange yellow. The complementary of green is violet red and of violet a yellow green or green yellow. The complement of red is blue green, and of orange a green blue." Skill in discovering color-complements is valuable in building color harmonies.

The Production of Color-Harmonies.—"Two colors are said to be in harmony or to combine harmoniously if the effect is pleasing when they are in juxtaposition or are used in composition." Complementary colors, for example, are harmonious, unless in composition some of them should be in contradiction. For the explanation of the five or six kinds of color harmony the reader is referred to the Bradley books. Skill in building color harmonies is of immense importance to personal attire, house-furnishing, house painting, cloth manufacture, etc.

Standard Colors.—Standard colors are the full tone colors of the solar spectrum. "The amount that rays of light are refracted from a straight line in passing through a prism is in proportion to the number of waves or undulations per second, and in inverse proportion to the length of the waves. The red rays are refracted the least and are the longest, while violet rays are refracted the most and are the shortest." The colors resulting from the following wave-lengths are recognized as standards: red, 6600; orange, 6100; yellow, 5800; green, 5200; blue, 4700; and violet, 4200. The figures represent ten millionths of a millimetre.

Color Scales of the Solar Spectrum.—"Any pure or full color mixed with white, or reduced by strong light," is termed a *Tint*. "A full color in shade, *i.e.*, with a low degree of illumination," is termed a *Shade*. "A *Scale* is a series of colors consisting of a pure or full color at the centre and graduated by a succession of steps to light tint on one side and a deep shade on the other." In other words, a color scale is any spectrum transition from tint through tone or fulness into shade, and there must be as many possible color scales as there are standards or tones in the spectrum. "A color mixed with a smaller quantity of another color is called a *Hue*." A knowledge of color scales and skill in basing color matching, color mixing, etc., on such knowledge are of much importance to teachers.

Broken Colors.—"In addition to the spectrum standards and intermediate hues, and tints and shades, there is another class of colors which in general terms may be called Broken Colors. A broken color, as a broken red for example, is a standard red mixed with neutral gray, that is, with black and white. In still other words, a broken color is a tint of that color in shadow. In Nature nearly all colors are broken." The same thing may be said of tapestries, carpets, ladies' dress goods, etc. "Ecru," for example, is a broken orange yellow, whose proportions in terms of 100 are orange 12, yellow 15, white 17, and black 56. Knowledge of this sort is interesting to pupils and important to teachers.

THE ORDER OF COLOR LESSONS.—In the succession of color-lesson undertakings the teacher must be governed partly by the requirements of apperception loosely indicated by the order of topics under Course of Color Lessons, partly by the stimuli with which he may be able to appeal to the pupil, partly by the pressure of economy, and partly by the possibilities of his own training and immediate access to books, etc.

The Method of Color-Lessons. — Important preparations must be made for most color-lessons before the recitation can be a success.

PREPARATION FOR COLOR-LESSONS.—(1) The necessary materials for a color-lesson must be procured. The pupil ought to be called into wisely supervised partnership with the teacher in procuring the materials. For some things, such as a color wheel, prism, etc., the teacher may of course have to ask the school directors. Every school-room in which color-lessons are to be taught should, if possible, be supplied with prisms, color wheel with Maxwell disks to suit, color-tops with corresponding disks, colored crayons, water-colors, sheets of colored tissue paper that does not contain arsenic. Silks, worsteds, etc., should be added. Pupils should be encouraged to collect colored leaves, etc. When the time for recitation has come, the necessary materials should be on hand and in working order. (2) It will be necessary for the teacher to make many experiments with prisms, color-wheel, color-tops, etc., to be ready for the recitation tasks. (3) The pupils should be required to make such preparations as the nature of the case may demand. As a rule, only older pupils can be expected to make formal preparations for color-lessons.

THE RECITATION OF COLOR-LESSONS.—(1) All color-lessons, like other lessons, should begin with observation. It is usually easy to interest pupils in color-lessons. Beginners should be taught by means of experiments made by the teacher. He must find ways to cause his class to watch all that happens, and to understand the results somewhat, as in mixing colors, finding color-complements, building color harmonies, color-charts, etc. Older boys and girls should, under proper directions, be led to make experiments for themselves, watching sharply what happens under the exact conditions. The teacher must lead them to understand the results as fully as possible. (2) Induction should follow observation. In other words, the pupil must be led to see what happens again and again under the same conditions until by comparison of results he arrives at generic conclusions, as when in mixing yellow and blue tissue paper in strong sunlight the pupil discovers the result always to be green. Trying yellow and blue crayon on the blackboard, yellow and blue disks on the color-tops, yellow and blue rays of the prismatic spectrum, etc., he still finds the same result. He has thus found the "green" law. The induction is the same for color-complements, color-harmonies, etc. (3) And deduction should follow induction. In other words, the pupil should be led to use the color-laws as much as possible. It is thus that science becomes art.

All the technical language to be developed in connection with color-lessons should be introduced in strict association with that which it expresses. Language work may be effectively connected with color-lessons.

Value of Color-Lessons.—To appreciate the value of lessons on color, the reader must understand their efficiency as a means in culture and instruction.

1. There is a general agreement among educators that color-lessons when properly given exercise and improve all the faculties of the mind. The Methods student should be required to prove this conclusion.

2. The knowledge of color is interesting for its own sake and a means in the interpretation of the universe as organized for service and beauty.

3. Both the culture and the knowledge acquired in color-lessons serve many of the ends of life, and cannot be omitted in our times without serious disadvantage to millions of people.

4. All teachers should therefore be able to give such lessons. The evidence of such ability should be as much in demand by those who license and employ teachers as the evidence of ability in the other branches of the curriculum. Normal schools should offer the most thorough course in colors and in the method of teaching colors. The task of thus equipping teachers must fall partly on the department of physics and manual training and partly on that of pedagogy. The most remarkable progress along these lines is visible everywhere, and the prospects are decidedly encouraging.

Nature Study

When love of Nature, and loving communion with Nature, rather than her uses or other desirable results in education, are the special ends in view, the study of Nature, to distinguish it on the one hand from ordinary object lessons and on the other hand from formal science in its process and results, is technically termed *Nature Study*.

Course of Nature-Study Lessons.—The concept just defined at once lays the stress on (1) the interesting habits of Nature, (2) on her secret haunts, (3) on her beauties,

(4) on the endearing language with which the lover of Nature must express the joys of his communion with Nature, (5) etc. The concept in question also lays stress on the domains of mineralogy, botany, and zoölogy, but does not rigidly confine us to these domains.

Botany.—The habit of observing plants should be cultivated early and late in our schools. The teacher should strive to rouse great interest in these observations, leading the children to think for themselves. Our pupils should be taught the names of the common plants, flowers, trees, etc., in their neighborhood, in connection with some of the most interesting facts pertaining to such growths.

Zoology.—The habit of observing the insects, birds, mammals, etc., in the neighborhood, should be developed. As in the domain of botany, the teacher should try to arouse interest in these animal studies, leading the pupils to think for themselves and to come into touch with the heart of Nature. Our pupils should be taught the names of common animals, their homes, together with the interesting facts.

Note.—Courses similar to those just suggested for plants and animals, should be explained in mineralogy, physiology, etc. But, although in the teacher's mind there should be some system of selecting subjects, the selection should always be in harmony with the distinguishing concept of Nature Study.

The Method of Nature-Study Lessons.—In accordance with the special ends in view much informality or freedom must be allowed in the selection of materials for the lesson. All the pupils should be urged to keep the heart open to all the calls of the Nature in the neighborhood, and no rigid limits should be set. Nor should the formal steps of science be taken with the usual stress on each and in the usual rigid succession. Free conversation, impulsive questions, almost anything short of impropriety, should be allowed in the recitation if it brings the pupil near to Nature's heart. The development of the Nature Study concept has already produced a large and stimulating literature on Nature Study, but, while such help points to the open doors to fertile domains, stimulates the pupil to study, and offers suggestions on the way, the study of such books is not Nature Study either in spirit or method. The attacks must be more direct and free.

Value of Nature Study.—(1) To be near Nature's heart in the way pupils arrive there through Nature Study is an immense gain to happiness, first for those who can or must spend their lives in field and meadow, in forest or mountain, and then also for those city people whose only direct contact with Nature is the Summer vacation. Nature Study as set forth is a veritable revelation of mysteries—a glimpse into the thoughts of God, of which Nature is a rich embodiment. (2) Beyond the happiness thus obtained is the use of the knowledge and culture thus acquired to farming, fruit growing, care of animals, etc. The practical results of Nature Study, not to say anything of the happiness coming from felt nearness to God, are worth all the time they require. The teacher who cannot or will not teach Nature Study is sadly out of place in our public schools.

History of Nature Study

The nature-study movement as distinct from science is among the very latest things in education. School children, as statistics showed, were beginning to " grow away " from Nature. The strictly scientific approach to insect and flower, for example, was too cold a process. Genetic adjustment of the method of approaching life around us was therefore substituted, and the child at once began to respond with energy. The living wholes instead of dead dissections now became the object of study. The stuff to be included in the course could not be catalogued alike for every school. The locality to which the school belonged became the field of interest, and whatever became attractive to the pupil was included as a subject. This movement in favor of the seeking individuality, this refreshing recognition of one's self in Nature, has become the golden gateway to the wonderland that lies about the boys and girls almost anywhere. Among the men who have helped the movement powerfully are Professor Earl Barnes, Dr. Schmucker, etc.

Supplementary Reading.

1. The Nature Study Movement. Bailey, N. E. A. Report, 1903.
2. The Teaching of Nature Study. American Education, December, 1907.
3. Foundations of Nature Study. Pedagogical Seminary, April, 1900.
4. The Study of Nature. Dr. Schmucker, Lippincott's Educational Series, 1908.

CHAPTER II

READING

Nature

Thought can be expressed in such sight symbols as words, figures, etc. As soon as the system of symbols used to express thought through sight is mastered by any one, he can of course get thoughts expressed by means of such symbols. Thought gotten through sight symbols can be expressed by using oral equivalents for sight symbols, the oral equivalents appealing to the mind through hearing. The processes described taken singly or together constitute "Reading."

Reading Defined.—In short, *reading is the process of getting thoughts through sight symbols and expressing them through oral equivalents.* Or still more briefly, reading is thought-getting through word-getting.

The Subject of Reading

Analysis shows that the stuff upon which the mind must work in learning to read and in reading after learning how, consists of letters, syllables, words, and sentences. The processes to which attack upon this stuff gives rise in oral reading are respectively enunciation, syllabication and articulation, pronunciation, comprehension, and expression. Although sight-reading, as it is called, is well enough defined as getting thoughts expressed by sight symbols through these symbols, the process can probably not be separated from the oral accompaniments with which it becomes unavoidably associated in the learning process.

Enunciation.—(1) The act of giving a letter a sound for which it stands in a spoken word is called Enunciation, as in the oral analysis of the word bell, where the *e* has a short sound represented by *ĕ,* and one *l* is silent. Lisping is the substitution of the *th* sound for the sound of *s* unmarked, as in sing. (2) The rules to which custom subjects us in enunciating letters are termed Laws of Enunciation. Thus *s* is nearly always like a *z,* except with f, k, p, and t, as in sing, sings, sit, sits, tease, teases, house, houses, etc. *X* is like *gz* before accented vowels, like ks in other places, as example, exercise, excellent, etc. *Th* is dull in pronouns, adverbs, etc., as in thee, those, there, etc. *Wh* is like *hw,* except in who, as in where, why, when, etc. *B* should not usually be sounded like *p,* nor *p* like *b; d* not like *t,* nor *t* like *d; v* not like *w,* nor *w* like *v,* etc. Thorough training and an "up to date" dictionary are indispensable equipments, especially in connection with a language in which the value of letters is ambiguous.

Syllabication.—(1) Syllables are the parts into which convenient vocal pause divides words, as in the word succeeded, where two pauses produce three syllables. The analysis of words into syllables is termed Syllabication, as in con-se-cra-tion. (2) As a rule—and this is the only law to which syllabication is subject—all prefixes and suffixes form separate syllables, as in com-pre-hend-ed. There are exceptions. (3) The term Articulation denotes the process of bringing the syllables of a word, like the bones of a finger, into right connections. Articulation, unlike syllabication, is an oral synthesis.

Pronunciation.—(1) Pronunciation is the uninterrupted articulation of a word with stress on one or more syllables. The stress put on important syllables of a spoken word is termed Accent, and the selection of the syllables for such accent, including the act of putting it on the selected syllable or syllables, is termed Accentuation, as in the word cóm-pre-hen′sion, where the less forcible stress put on the accessory syllable *com* is called the "secondary" accent, while the stronger stress put on the fundamental syllable *hen* is called "primary" accent. (2) The rules to which "convention," or custom, subjects us in accentuation are termed Accentuation Laws. Thus, derivative words take for a time, if not permanently, the accent of the original words from which they are formed, as in contentment, apprehend; ease of utterance frequently prevails over derivation in determining the accents of a word, as in utensil and excellent; in words of two syllables there is a tendency to accent the first syllable of a noun and the last of a verb, as in convert, accent, record; in words of three or more syllables there is a strong tendency to accent the antepenult, as in contemplate, eloquent, intricate. There are many exceptions to these tendencies. Constant reference to dictionaries is the only safe thing.

Comprehension.—To "comprehend" in reading is to get the thought expressed in sentences. The ability to comprehend the thought of a sentence through the eye comes through sentential association of sight words with spoken words. To run through a sentence with the eye or pronounce all the words without comprehension is not reading at all. Without comprehension on the part of one who reads, *i.e.*, goes through the motions of reading, he cannot effectively bring thought to listeners.

Expression.—The word "expression" used technically in a description of oral reading denotes those adaptations in pronunciation, posture, face, and gestures, by means of which thought is effectively conveyed to hearers. The most important adaptations in pronunciation are pitch, time, force, quality, emphasis, and fluency.

PITCH.—The degree of elevation of the voice in reading is termed Pitch. Pitch is high, medium, low, monotonous, or varied. It is through this in part at least that sentiment, or feeling, must be expressed in reading.

TIME.—Every variety of pace, or movement, in reading is termed Time. The time, or rate, may be fast, ordinary, slow, or varied. It is through time that excitement, self-control, etc., are expressed.

FORCE.—Degree of stress in reading a sentence is termed

Force. Force may be energetic or intense. In either case it may be subdued, moderate, extreme, etc. It is the mission of force to express strong feeling and to help the ear of the distant hearer.

QUALITY.—Tone of voice in reading is termed Quality. The voice may be pure, aspirated, guttural, nasal, rotund. It is through such adaptations that all shades of feeling may be effectively expressed.

EMPHASIS.—(1) Any impressive way of uttering words or phrases in reading is termed Emphasis. The four species of emphasis are stress, pause, inflection, and time. The extra force with which some word or phrase is uttered in reading is termed stress. Stress may be compound, intermittent, median, radical, or vanishing. When, after uttering some word in a sentence, the reader stops, or allows an interval of time, before he proceeds, the emphasis is termed Pause. Graduated rise and fall in pitch is termed Inflection. Quick, ordinary, or slow utterance of a word is called Time emphasis. (2) The rules to which the nature of the mind subjects us in emphasis are termed Laws of Emphasis. Thus, words expressing new ideas, important ideas, and contrasted ideas are emphasized in effective reading.

FLUENCY.—(1) Uninterrupted flow of words in reading is termed Fluency. Fluency is not less but more effective when the pitch, time, force, quality, and emphasis are properly woven in with it. (2) Involuntary hesitation in pronouncing the next word is called Stuttering. The involuntary repetition of initial parts of a word in pronouncing it is termed Stammering. Both are awkward, and sometimes distressing obstructions to fluency.*

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* It was deemed necessary to explain enunciation, syllabication, pronunciation, expression, etc., as fully as has been done, so that clearly seeing the tasks to be accomplished in teaching reading, the teacher might find the means to ends in the method of teaching. For fuller explanation of all points involved, including posture, face, and gesture, the student is referred to any treatise on elocution.

The Psychology of Reading

The mental action to which learning to read and reading gives rise is somewhat complex and *sui generis.*

Observation.—(1) The conventional sight symbols of reading must be learned by perceptive association with speech. This is a complex combination of the sense of sight, the sense of hearing, memory, and will. Whether the symbol to be learned is a word, a syllable, a letter, or another mark, makes no essential difference.

Introduction.—By a short-cut process of induction, hardly amounting to more than the recognition of similarity, words, syllables, letters, and so forth, used as sight symbols become laws.

HABIT.—If the learner is unfortunate enough to be under teachers whose enunciation, pronunciation, etc., are defective, he is likely to acquire the same defective habits, and, by arrest of development, to be a slave to them as long as he lives.

Deduction.—The use which the reader makes of words, phonograms, habits, etc., in reading, is really a deductive process often consisting of quite difficult analysis and synthesis.

Courses of Reading

The genetic adjustment of the stuff to be taught in apperceptive sequence requires three courses in the teaching of reading.

Course for Beginners.—(1) A new skill, motor expression involving imitation and competition, and story-life, please the beginner. (2) The beginner may accordingly be expected to acquire a large vocabulary of sight-words through sentences. His love for "the story" combining with his love of motion coöperate powerfully to bring about the results we want. The new power which he gains with greater and greater rapidity through phonograms, and of which he soon grows more and more conscious, make him respond with energy to exercises in enunciation, articulation, pronunciation, etc. In the sequence of lessons, apperception should control.

Intermediate Course.—(1) The desire to know what books contain, coupled with the strong desire to think what others think, ripens quite rapidly between the ages of eleven and fifteen or sixteen. (2) The average grammar school pupil will accordingly respond with energy to efforts on the part of the school to perfect the mechanics of reading and to master reading as thought-getting. The course should make it possible for him to read ordinary books and periodicals intelligently, so that if he must leave school at sixteen, he may be able to continue his education indefinitely.

Higher Courses.—(1) The high school pupil may be taken up with many ambitions, but he cannot help seeing the invaluable service of books as tools. (2) Expressive reading, supplementary reading, periodicals, the library, the reading circle, etc., now appeal to him, and he should have the strong support of the school. The pupil's individuality should be recognized, but superior personality should supervise.

TEACHING READING

The relation of the stuff to the learner must determine what the methods of instruction ought to be. This relation has been variously interpreted by educators, and reduced to various psychological methods of teaching beginners to read.

Methods of Teaching Beginners

The A B C Method.—(1) The sound or sounds for which a letter is made to stand is often very effectively suggested by the conventional name of the letter. Such is the case, for example, with b, d, f, h, j, k, m, n, p, q, r, t, v, w, and z. With other letters this is only apologetically true, as with a, c, e, g, i, o, s, u, x, and y. It is therefore possible to teach pronunciation by teaching the names of the letters employed, and thus suggesting sound values. This method of teaching beginners to read is familiarly known as the "ABC" method. (2) Some things must be said in favor of this ABC method, but this especially that it combines spelling with pronunciation, and thus tends to make good spellers. Then, too, it does not cumber the mind of beginners in reading with burdensome diacritical marks. On the other hand, the fatal things that must be said against the method are that it is not apperceptive by nature, because the learner, if his mother tongue is English, begins with word-wholes; that it puts "the cart before the horse"; that in many instances due to our orthography the names fail to suggest the sounds effectively, thus making the child too dependent on the teacher; that it hinders thought-getting, and that it is thus uninteresting; and that it tends to retard the progress of the pupil in acquiring fluency.

The Phonetic Method.—(1) Inasmuch as the English language has approximately forty sounds, the addition of fourteen new letters would make it possible to denote all these sounds separately. This method of teaching beginners to read may be called the Phonetic method. (2) The advantages are important. The method rids us of silent letters, double letters, equivalents, and irregularities. The learner can pronounce any word made up of such letters as soon as he knows the sounds of the letters used, thus emancipating himself very quickly. (3) More time is left for thought-getting. This fact coupled with earlier fluency makes the method not only interesting but effective. On the other hand some serious practical difficulties handicap us in the use of the Phonetic method. As long as only twenty-six letters are used in books, etc., diacritical helps must be learned at all events in the learner's emancipation from the teacher, and this might as well, perhaps better, be done at once. Then, too, by nature it is just as unapperceptive as the ABC method.

The Phonic Method.—In addition to the ABC method and the Phonetic method a third alphabetic method is possible. The twenty-six letters of our language, or combinations of these letters like gh, th, etc., can be specially marked to help them effectively to represent the sound or sounds for which they are to stand. This system of diacritics is used in our dictionaries. When used to start with in teaching reading, it is called the Phonic method. There are three possible variations of the Phonic method.

a. The pupil may be introduced to the sound of the letter diacritically marked, if this be necessary, by direct association of form and sound, as in writing the letter and sounding it for the pupil. Letters thus taught are then to be combined into the words for the sake of which they were taught, as c a t, cat. This word-building process is synthetic.

b. The sounds to be taught may first be presented to the pupil's ear through oral analysis of a known and simple spoken word, as sings, s i n g s, the teacher writing the letters diacritically marked, but some distance apart on the board, thus associating the form of each letter with its sound. The word must then be correctly written and the pupil drilled, after which new words can be pronounced by means of the letters learned. Beginning with the oral analysis of a known spoken word, the process completes itself in the visible synthesis of the word through which the letters are introduced, and the pronunciation of a new sight-word is analysis by eye followed by oral synthesis.

c. The sounds to be taught may first be presented to the pupil by calling his attention to them in Nature, then requiring the pupil to imitate the sounds, and representing them to him on the board by means of letters diacritically marked. The letters must thereupon be combined into sight-words and pronounced, thus completing the process. It is in this way, for example, that the word *so* can be taught by imitating the sound which a goose makes when you pass and the *o* of a sudden surprise. Beginning with imitation, followed by association of sound and form, the method completes itself in sight and oral synthesis combined.

It must be said in favor of the Phonic method in all its varieties that it slowly but surely emancipates the learner from the teacher, and that it prepares the pupil for intelligent use of the dictionary. When the pupil is exercised constantly in marking the letters of words already learned, it tends to make good spellers. When the sounds are introduced through the oral analysis of known spoken words or by imitation from Nature, the Phonic method is also sufficiently apperceptive. In the hands of a resourceful teacher the "Nature" method becomes startlingly interesting. And even the burden of the necessary diacritical encumbrance can be relieved by ingeniously suggestive stories, which also add to the interest. On the other hand, it must be said that for the first year or two—just when it is specially wrong—the pupil is too much weighted down with diacritical burdens. This hinders the attention to thought-getting which it is so important to associate with word-getting in teaching reading. It also interferes seriously with fluency by the habit of sight-analysis which it tends to form in the pupil.

THE POLLARD METHOD.—The Pollard method, so called after Mrs. Pollard, *begins* with sounds, as *ă* and *m*, prompting the pupil to find these sounds first in Nature and then to imitate them, as already explained. It groups these sounds into "families," as *am, at, ack,* and "keys," as b, f, l, t. It employs a story called the "Johnny Story" to relieve and interest the learner. It resorts to analogies, association, and imagination, as when the child is required to imitate what the lamb, rooster, dog, etc., say. It *builds* words, *visible* words, pronounces them, and then *recognizes* these uttered words as names of objects, actions, qualities. It aims from the beginning at the child's emancipation in pronunciation. In the hands of a resourceful well-trained

English-speaking teacher it makes defective enunciation almost impossible. In general it has the merits and defects already explained in the last paragraph under the Phonic method.

The Word Method.—(1) It is possible to begin with words instead of letters in teaching reading. The method is then called the Word method. The word may be presented to the pupil in several ways. A correctly spoken word, the name which the pupil has associated with known objects, actions, qualities, etc., may be written on the board, thus passing apperceptively from the spoken to the written word. Words thus taught are then built into the sentence for whose sake they were selected, thus combining thought-getting with word-getting, and preparing for effective expression in reading. The word to be taught may be written on the board and pronounced for the pupil, thus introducing him directly. By means of objects, actions, etc., the meaning of words thus taught can be added. The words are then ready for sentences as before. (2) In favor of the word-method—especially when it begins with the known spoken names of objects, actions, qualities, etc.—it must be said that it begins where mother begins in building the child's vocabulary. It is therefore both natural and interesting as a beginning. On the other hand, against it must be said that, unless it is supplemented by much practice in phonic analysis and synthesis, it keeps the learner dependent too absolutely on the teacher. If the words used in this connection are too non-phonetic, the phonic drills to be associated with this Word method will be almost impossible. And when the words are not selected with the building of certain sentences in view, the introduction to reading as thought-getting will be very awkward.

The Sentence Method.—(1) It is possible to begin with sentences, rather than with words or letters. This method is appropriately called the Sentence method. If the sentence used is short, and the child's eye-memory is known to be equal to the task, the sentence may be written on the board and read for the pupil. He must then be required to read in imitation of the teacher. Unless thought-getting paves the way this method is an outrageous strain on the eye-memory of the learner. The only sensible way to prepare the pupil for this task is to give him a thought through objects, actions, etc., then write it, read it, and have him imitate, as when a boy has been asked to run, and the class has been asked to tell what the boy is doing. They will say, The boy runs. Then it is time to write the sentence, etc. When the sentence has been taught as a sentence, it is analyzed into the words of which it is composed, and the words into the letters and sounds of which these are composed. (2) For the Sentence method it must be said that in the hands of a resourceful teacher, it is sufficiently apperceptive and, because thought-getting leads, it is both rational and interesting as an introduction to reading. Vocabulary is rapidly acquired, and, from seeing the teacher write the words separated from their associates in sentences, he learns to write while he learns to read. But against the method must be said that, like the Word method, it keeps the pupil too dependent on the teacher unless combined more or less almost from the beginning with emancipating phonic analysis and synthesis.

The Comprehensive Method.—Miss Emma K. Gordon has attempted to combine the best features of the phonic, word, and sentence methods. The method has therefore been called the " Comprehensive " or " Gordon " method. (1) Through conversations specially devised, etc., the system cleverly avoids the use of diacritical marks. (2) The phonic facts to be memorized are amazingly few. (3) Through specially devised charts and drills the system serves the interests of English spelling. (4) The vocabulary is carefully graded.

The books employed divide the work into two courses of five months each. Three phonic charts, six equivalent charts, and forty-four letter squares are employed. The Gordon method has attracted considerable attention, and is certainly ingenious. The publishers are D. C. Heath and Company.

The Rational, or Ward Method.—(1) The "Ward" method is so called after Edward G. Ward, who prefers, with much reason, as we shall see, that it should be called the "Rational" Method.

THE WARD WORDS.—The "stuff" with which the Ward teacher works consists of words specially selected for the purposes. First of all, the words selected must be words which are the names of objects, actions, qualities, etc., known to the large majority of children before they come to school and then they must be parts of longer words so that the longer words may be taught by means of the shorter ones.

SIGHT WORK WITH SENTENCES.—The Ward teacher causes his class to think a thought which can be expressed in a short sentence made of the words which he hopes to teach. To accomplish this, James or Mary is requested to perform some particular action, as running, or to assume some particular posture, etc. If, as in the case of pupils whose mother tongue is not English, he can not cause some member of the class to put into words the thought thus taught, as, The boy runs, he will do it for the class. Then, turning to the board, he will write the thought, and ask the pupil to read it. Other sentences are then added and contrasted until they can be readily distinguished. After a few days the work of breaking up sentences into the words of which they consist begins. Covering some words with anything convenient, as the hand, the pupil is asked such questions as, Who runs? What does the boy do? thus causing him by suggestion to say and see the uncovered word at the same moment. Additional sentences are treated in the same way until the 83 words are known readily by sight. Much ingenious drill, or repetition, is added to make the lessons taught permanent possessions.

The Ward Phonograms.—Somewhere along the line, long before the 83 words have become perfect "sight words," *i.e.,* words known by the pupil as a whole by sight, a system of emancipating pronunciation-keys, consisting of letters like b, d, f, l, s, etc., of syllables like ack, ing, ight, and of sight words like am, at, ill, is introduced, and gradually mastered while the work on words through sentence building continues. These phonograms, at any rate most of them, are taught by writing on the board words which are capable of analysis into phonograms, as *sing,* readily broken up into the sounds *s* and *ing.* The parts of the word, like *s* and *ing,* are repeatedly uncovered and covered alternatingly while the teacher breaking up the word orally gives the pupils the respective sounds at the same moment. Then, when the sounds have been sufficiently disentangled from the spoken word-whole, they are allowed to run vocally and visibly together, as *s ing, sing.* This associative synthesis is called "blend." The teacher takes great pains to make sure that the pupil really gets the sounds exactly, and that they become perfect mental habits. Faithful repetition under the stimulus of much good mood, variation in arrangement, imitation, competition, etc., is the price which the pupil must be required to pay. A set of card phonograms, convenient and stimulating in connection with these drills, accompanies the Ward Manual for teachers. As fast as the pupil masters the phonograms he is required to use them in pronouncing new words. Here, by the aid of the teacher covering and uncovering the known parts of the new word to be pronounced, the pupil is required to sound the known parts correctly and then, after some repetition of the sounds in the order in which they belong to the word, to run them together, or "blend" them, thus pronouncing the new word for himself, very much in the same way as he is taught to find sight words in sentences. The success of this blend work will of course depend almost wholly on the resourcefulness of the teacher and the talent of the class.

Worth of the Ward Method.—(1) The Ward transfer of the pupil's spoken thought, "taking the learner where he is" and passing from the related known to the new, is absolutely apperceptive. This is also true of the analysis which the learner is required to make, first of the written sentence to find the separate sight words wanted, and then of the sight words to find phonograms, and finally of the synthetic use of phonograms in pronouncing new words. (2) The purposeful selection of the Ward 83 words to be taught by sight is far more rational than the haphazard, go-lucky selection of words so common to the older Word method. (3) But the "brand new" thing in the Ward method is the kind of phonograms to be employed. The letters, syllables, and words of which the Ward phonograms consist are so selected, and such is the order in which they are presented to the pupil, that the use of dictionary diacritical marks is kept down to the minimum. In this respect the Ward method is infinitely less cumbersome than the Pollard method. In other words, the Ward trained pupil coming to a new word with pronouncing keys which consist not only of letters but also of syllables found in thousands of English words and of shorter words found in thousands of longer words, will be able to pronounce new words correctly in less time than the Pollard trained pupil with his diacritical phonograms, as in the word *sing,* where the Ward pupil needs only two keys, *s* and *ing,* while the Pollard pupil needs at least three keys, s ĭ ng. The Ward phonograms contribute to greater fluency not only because the number of pronouncing keys with which the pupil must work is smaller than that of the Pollard method or the ordinary Phonic method, but also because, consisting partly of syllables and shorter words, they lead to a less analytic habit of looking at words in reading. Thus two of the most important ends in view in teaching reading, namely, fluency and the pupil's emancipation, are most effectively secured through the Ward method. The method is also a more effective training in enunciation and articulation because the phonograms used consist of the natural "stuff" of enunciation and articulation. In the end much time is gained by the Ward method, and this makes it possible to combine more good supplementary reading with the reading lessons than any other method. Besides all these advantages, any one fit to be a teacher can prepare himself more quickly to use this method than the next best one—the Pollard method. The only conspicuous defect of the system is its tendency to produce poor spellers because, as stated, it accustoms the pupil to see words with less analytic attention; but since spelling, as we shall see, must at all events be learned by spelling, the defect, if such it is, can readily be corrected by spelling enough to meet the wants of the class. The wonder is that no one lighted upon a system so manifestly psychological and practical long ago. Only the magic spell of tradition seems to account for such dulness.

ECONOMIC ADAPTATIONS

The reading lessons, like others, must be prepared and recited, and the habit of reading good books developed into love.

Preparations for the Recitation.—The purposes of the recitation, as we shall see, require that both the teacher and the pupil make faithful preparations.

The Teacher's Preparations.—Apart from the special training which the teacher of reading needs as a consequence of the psychological difficulties and the value of reading in an education, he must make daily preparations. Among other things he must keep a correct record of the ground covered and the victories won, set his mind upon new recitation purposes apperceptively, master the details of pronunciation, comprehension, and expression that will be sure to come up on the way to the ends in view, prepare materials and plans for special drills in expression, and take the measure of the lesson to be assigned before the close of the recitation.

THE PUPIL'S PREPARATIONS.—(1) By watching and imitating the teacher at the board, beginners in reading soon learn to write. After that they can be required to copy words and sentences left on the board purposely. Presently they can be required to construct sentences of their own, following the teacher's directions. After books have begun to be used in the recitation, apperceptive preparations can be required, the pupils copying gathered up review work placed on the board by the teacher. To redeem the recitation of beginners from the dead monotony so common in the "older" days, first year pupils in reading should seldom be allowed to take their books with them to their seats or homes. (2) Older pupils should be required to read the advance lessons, making honest efforts to understand the thought, to pronounce new words correctly by means of given phonograms, to practice for fluency, etc. Still older pupils should be required to copy the lesson, care being taken of capitals, punctuation, neatness, etc. Sometimes the pupils should be asked to write the story of the lesson in their own words. To correct the tendency of the Ward phonograms to produce poor spellers, the pupils must frequently be requested to select and copy words from pages already mastered, but always according to specific directions.

The Recitation in Reading.—The purposes of the recitation in reading determine the method of procedure.

PURPOSES.—The recitation in reading should cause the pupil to use not only his eyes and ears, but also his imagination, thought, memory, and heart. And these results should be secured not only during the recitation, but between recitations. The recitation should furnish effective exercise in reading as such, but also in special enunciation, articulation, pronunciation, comprehension, and expression.

Dark points should be cleared up for the learner, and necessary directions, suggestions, etc., properly given.

Accomplishing the Purposes.—(1) To begin with, the teacher's spirit should be sympathetic and encouraging, the lessons for beginners should consist largely of "action stories," the pupil's desire to compete with his fellows should be wisely called into service by letting him try to do as well as or better than others, or by letting pupils a little older trap each other in connection with the spelling of the reading lesson. The resourceful teacher will find other stimuli. (2) To cause reading classes to attack the lesson with all their mental faculties, especially with thought and imagination, the teacher must ask appropriate and pointed questions, and by and by require the pupils to tell the story of the lesson. (3) Difficulties in reading tasks should be illustrated skillfully, explained inspiringly, and then put to the test.

Conveniences.—(1) Every school room should be supplied with suitable supplementary readers. Books on geography, travels, biography, history, nature, literature, etc., may be had in almost any variety. At appropriate times it should be required of pupils to read *at sight,* or after sight, some paragraph or page that ranks in difficulty with that of his lessons. This requirement being a variation from the usual text, will stimulate interest, enlarge thought, and produce the habit of reading outside of school hours. (2) The blackboard is more interesting to the learner than the chart and books, because it makes movements the object of attention. It is with the blackboard that the teacher can best show the children how to write sentences, words, and letters. Indeed, the pupil that watches his teacher write words and letters day after day, and then imitates them between recitations, will learn to write, as stated elsewhere, without much additional instruction. (3) During the first months it is better to use script than print. The use of script saves time, helps the pupil learn to write, and is easier on the pupil's nerves and hand than printing the work to be done. When the time comes to put a printed book into the hands of the child, the transfer from script to print can be accomplished in a very few recitations by writing words in both forms under each other letter for letter and calling attention to the likenesses. (4) Capital letters should be taught only as fast as needed, and by writing them side by side, or under, the corresponding small letters, *i.e.,* by association. Very little explanation will be needed.

Special Tasks.—Among the somewhat special tasks of the reading teacher are the teaching of alphabetic names, the correction of lisping, stammering, and stuttering, and the fostering of the reading habit through school libraries.

ALPHABETIC NAMES.—(1) At first, and for months, the name of a letter like *a, s, x,* etc., is not only not needed in pronouncing, but really hinders the pupil by protruding itself into the child's mind just when the sound is more important. Presently, however, the pupil must be taught the alphabetic names to encourage the analytic habit in spelling words that have silent letters, doubles, equivalents, etc., and to save time in spelling, as any one can prove for himself with a long word by spelling it first by sounding the letters and then by naming them. (2) In due time, as a convenience in consulting dictionaries, cyclopedias, etc., the alphabetic names should be taught in right order, both backward and forward. (3) The best way to learn the names of the letters is by suggestive association with the corresponding sounds. In attempting to commit the conventional order of the letter names persevering repetition is the only hope of success. Beginning with a few letters, new ones should be added and the amended series repeated, and so on. It may be done in special recitations or in connection with exercises in reading.

LISPING.—(1) Among the familiar causes of lisping are association with some one who lisps, childish affectation, and a tongue that is a little too long. (2) The remedies in the first and second cases are the removal of the causes. When the defect is in the tongue the pupil must be made to realize the defect, and to control his speech constantly until such control becomes automatic. Excitement by nagging or abuse is simply out of place.

Stammering and Stuttering.—(1) Stammering is usually caused by impulsive hurry. The pupil should be required to control himself in order to keep the fault from becoming a habit. (2) Stuttering is a nervous inhibition of speech, and as such can often be corrected by improving the general health of the pupil. The teacher can usually keep the pupil from stuttering by putting him at ease in every way, and when the pupil can not proceed the teacher can usually help him by starting the sentence from the beginning. It is of great importance to keep the pupil from being made conspicuous or the object of ridicule.

Elocutionary Drills.—It is not the function of the public schools to develop specialists in expression, but that fluency which consists of rapid recognition, correct and rapid articulation, freedom from hesitation in pronunciation, together with skill in pitch, time, tone, force, and emphasis, is a very desirable attainment in any education. Good teaching will make every recitation count for something, but occasional special exercises are profitable. Drill on difficult phonetic combinations, as, She sells sea shells, Theophilus Thistle in sifting, etc., Round the rough and rugged etc., are very good. The rate should be slow to begin with, and increase to great speed, but never at the expense of clearly defined enunciation and articulation.

School Libraries.—Before the boys and girls leave the common school they should acquire love for good books and the habit of reading such books. The ordinary school does not produce this result because the school library is wanting. In order to cultivate appreciation for good books, and to foster the habit of reading such books, a suitable collection of books should belong to every school. To intensify personal interest, the pupils themselves, directed of course by the teacher, should have part in the work of securing the school library. If possible the school-room should also be supplied with a safe periodical and newspaper.

Value of Reading

So great is the natural difference between reading and real perception that the former can never be a perfect substitute for the latter. And yet for many practical purposes the " second hand " perceptions of reading are very satisfactory substitutions for real perception. For all the other mental faculties reading can be made a most effective exercise. When training in reading has made books tools for all the mental faculties, it emancipates the learner from the teacher in his studies; it thus makes it possible for the teacher to employ the learner profitably between recitations—a most important consideration, seeing that in any ordinary school there must be times when the teacher simply can not work with the pupil; it makes it possible for the boys and girls to carry on their education after their school days must end; and in this process of post-graduate education they may, especially if they have access to a good home or public library, experience mentally, at least in a measure, all that the masters in science, literature, history, art, philosophy, and theology, have experienced. In other words, reading opens the door to all the centuries, and makes it possible for a good reader to become the veritable " heir of all the ages." Then, too, the expressive reader, like Leland Powers in public, and hosts of our friends in society and home life, can help to make the world very happy. If these things are true (and how can it be otherwise?) no training of teachers in reading can be too good for our children, and no school that allows its pupils to neglect reading can be called a good school.

History of Reading

Reading has always been the fundamental school study in all the civilized nations, excepting a few like ancient Persia and Sparta where the martial interests overshadowed purely intellectual pursuits.

The methods of teaching reading have changed for the better in startling proportion with psychological discoveries. (1) When the sounds of languages began to be represented it was done by pictures of objects, actions, etc., whose names suggested the sounds to be represented, as *gimmel,* meaning camel, was used to stand for the sound of hard *g.* In this way the ABC method naturally became the first method of teaching reading, and even now it has not yielded absolutely to newer methods. (2) The "Word method" was first used by Jacotot, a French Professor in Belgium (see "History of Education"). The most prominent early advocate of the method in America was Professor Webb, after whom it was called the Webb method for some time. In England it is called the "Look and Say" method, or the method of "Reading without Spelling." It led to an effective combination known as the "Word and Phonic" method, formerly very popular and still used. The "Gordon" and other methods are later adaptations. (3) The "Pollard" method came about fifteen years ago, and the "Ward" method less than ten years ago. Whether the apparently perfect Ward method can be improved remains to be seen.

Supplementary Reading.

1. A Phonetic Alphabet. Richards, N. E. A. Report, 1859.
2. Scientific Alphabet. Funk and Wagnalls.
3. The School and the Library. Morgan, N. E. A. Report, 1887.
4. What to Read, First Year High School. American Education, December, 1907.

CHAPTER III

WRITING

Nature

As stated in the chapter on Reading, thought can be expressed in such sight-symbols as words, figures, etc. *"Writing" is the linear construction of words, figures, etc., used as sight-symbols in the expression of thought.*

The Stuff of Writing

The stuff with which the pedagogy of writing has to deal consists of linear constructions, together with the bodily positions and movements by means of which these linear constructions are accomplished.

Letters.—The letters, figures, etc., of writing are the linear representations of elementary sounds in language. Small letters are employed in the body of words, while capitals denote distinctions, as in proper names or head lines. As to inclination letters may be uniformly vertical, or slanting forward to the right, or slanting backward. In Aryan languages, the English among them, the succession of letters is from left to right across a surface.

Linear Elements.—Script letters are combinations of straight lines, angles, and curves. (1) The linear elements of the various writing systems are comparatively few. Spencer, for example, employs only seven linear elements, or "principles" as they are sometimes called. They are the straight line , the left curve , the right curve , the loop , the capital stem , the direct oval , and the reversed oval . The height, width, and parts of every letter are definite quantities according to the system adopted. (2) In Spencer's slanting system the "down stroke" starting one space above the writing line meets it at an angle of 52 degrees, while in the vertical system the corresponding angle is of course 90 degrees. The down stroke determines the general character of letters as to connective curves, etc. In Spencer's system the left curve leaves the writing line at an angle of 30 degrees and with a short turn meets the down stroke one space high, while the right curve, leaving the writing line at the same angle, meets the down stroke in a thin acute angle. In a vertical letter the angle of departure is larger than 30 degrees for the upward curves, and the connecting loops fuller. In both vertical and the slanting systems, the loop, the capital stem, and both ovals are three spaces high. The loop, starting from the writing line, consists of a right curve and a down stroke. The capital stem, starting from above, consists of a sweeping compound curve that ends one space high. The direct oval, starting above, consists of a left curve, a right curve, and a final shorter right curve. The inverted oval, starting from the writing line, consists of a left and a right curve sliding into a down stroke. In recent systems initial strokes start at some distance from the writing line and final strokes often end abruptly. Both letters and figures may be perfected by shading, gratuitous and ornamental curves, etc. A clear conception of these linear elements of writing, kept well to the front, is one of the essentials in the pedagogy of writing, as we shall see.

Writing Ideals.—Writing is a mode of expressing thought. The letters employed as a means should evidently be legible, accurate, and beautiful, the time consumed in the writing process as brief as circumstances demand, while the positions and movements involved in the writing process should be as healthful as possible.

HYGIENIC PERFECTION.—The interests of physical culture, etc., require that the eye of the writer should not be strained by unequal tension of muscles possibly due to incorrect bodily positions and movements; that the lungs and other vital portions should not be crowded by leaning against forward supports; that the muscles of the back should not be hurt or the spine distorted by strained positions or lack of relief; and that ugliness of hand, imperfections of dexterity, or especially "writer's cramp" should not be made likely through defects in the pen itself or in penholding.

Legibility.—A letter is legible when it can easily be read. The interests of the reader require that writing should be legible. Considering the importance of convenience, comfort, and safety, a scrawl is as much of an insult to the eye of a reader as indistinctness of enunciation is to the ear of a hearer.

Accuracy.—A letter is accurately written when it is made to consist of all its necessary linear elements and when the writer began, continued, and ended as he should. Accuracy is requisite to perfection. As such, the interests of culture require that letters should be accurately written. Perfection as the limit to possibility is the only proper aim in the attainment of anything.

Beauty.—By physical beauty is meant that perfection which can be approximated by sensible forms of expression. Accuracy is only one requisite of physical beauty. In order to be beautiful, accuracy must be ornamented, as in writing it is done through curves, shading, etc. So delicate is the sense of beauty that it should never be sacrificed except to higher ends like usefulness, truth, or goodness. Of the ancient Greeks it was said that "ugliness gave them pain."

Rapidity.—By rapidity in writing is meant shortness of time required in movements. The interests of business, together with economy of labor, require that such rapidity should be an easy possibility for very many writers. Earning power in business employments, and coupled with it many possibilities, depend very much on speed in writing.

Position of the Body in Writing.—While it is possible, of course, to sit or to stand in writing, and to face either squarely forward, leftward, or rightward in both sitting and standing, the purposes in hand, together with the conveniences by means of which these purposes are to be effected, and the possible results to the body, etc., determine which of the possible positions should be assumed by writers.

SITTING IN WRITING.—When writing at a desk or table the hygienic requirements to which attention was called a moment ago are best served by facing squarely forward. The muscles of the eye, those of the back, and others involved in writing, are arranged in pairs, as anatomy shows. In the use of muscles, equal tension or muscle balance, as physiology shows, is of the utmost importance to the muscles themselves and of special importance to the nerves employed. The "front position," as it has been called, generally assures this much-wanted muscle-balance. And yet even this front position becomes fatiguing when too long continued. Therefore, both to prevent fatigue and as a relief from fatigue, side positions must frequently be substituted for the front position. Nevertheless, for all practical purposes, the front position should be the rule.

STANDING IN WRITING.—In school work, where the blackboard figures so prominently, as well as in counting houses, the standing position not only often serves as relief from the sitting position, but also serves many other important ends. While the teacher is busy with part of a class in oral recitation, others can be profitably sent to the board. As a rule, however, the writer at the board should not take the "front position," but the "left side position." In that event both the teacher and the class can see just what the writer may be writing. Then, too, the left side-position offers free swing to the arm in writing, thus making the work less fatiguing, and in the larger movements of the capital stem and both ovals it is the only proper attitude.

Movements in Writing.—The possible movements in writing are the movements of the fingers, the wrist, the forearm, and the whole arm. On which of these movements stress must be laid in teaching writing, and when, depends upon the nature of the movements themselves in connection with the teacher's purposes. As the condition of movements in writing, pen-holding must be considered first of all.

Pen-holding.—(1) To prevent strain of the nerves all the way from the fingers to the shoulder, and thus to prevent fatigue or possibly writer's cramp, the pen-holder should be five or six inches long, in which event it can be easily steadied against the hand near the end knuckle of the forefinger and made to point toward the shoulder. However, to secure these results effectively the arm dare not be drawn together too much, as it will be if the writer draws the paper too close to himself or leans forward toward the hand too far. (2) To get the pen, or pencil, thoroughly under control of the forefinger and thumb, it should be seized about an inch from the writing point, and cross the second finger on the corner of the nail. (3) To prevent the likelihood of spluttering the ink over the paper or copy-book, and also to protect the pen-points, they should be made to meet the paper squarely. (4) In operations where delicate skill is indispensable the world is almost wholly right-handed. Perhaps right-handedness is sensorially natural, perhaps it is the result of acquired hereditary momentum beginning with personal inauguration or even by accident. To know certainly, we should have to make inquiry into present tribal customs and the childhood of the race. Concomitant with this almost universal right-handedness in skilled labor and fine arts is right-handedness in writing. To be the exception in a writing exercise, as in life's united actions, is not only awkwardly inconvenient but awkwardly conspicuous.

Left-handedness.—To grow up left-handed in school is not only serious to nervous pupils, and decidedly awkward in those school exercises where space and imitative inspiration call for united action in the writers, but it tends to make the pupil largely left-handed in those life occupations where space and imitative inspiration call for united action. Accordingly, unless forbidden by weightier considerations, right-handedness should be substituted for left-handedness in education. In opposition to this conclusion it is sometimes alleged that left-handedness is cranially natural in at least some instances and that interference with such individuality may be injurious. This assumption—for it lacks proof—strangely overlooks one of the best attested facts of life, namely, the substitution of one for the other of a pair of nerve tracts in the effort of the brain to accommodate itself to new conditions. And nowhere is this power more conspicuous than in hands and feet in case of temporary or permanent injury to one of the pair. Nor do statistics show that personal efficiency or sanity are in any way injured by such reorganization of brain tracts. The only other serious question of pedagogy is whether it is really advisable to substitute one habit for another which amounts to hereditary momentum. To this biological question it is sufficient to reply that we never hesitate to interfere with hereditary, or congenital drunkenness, viciousness, etc. Here interference is confessedly the only hope of education. In short, the only thing of which the teacher must be sure is that the habit which is to be substituted is really a better habit and that it is both possible and practical to make the substitution. In beginners, as the physiology of habit shows, it is certainly possible to substitute one habit, like left-handedness, for another, and, in harmony with the reasons stated, the substitution should be unhesitatingly undertaken. Before undertaking the substitution with older pupils, the teacher should be reasonably certain of two things, first that the coöperation of pupil and teacher will not be seriously interrupted before the better habit can be completely established, since otherwise the pupil might not learn to write well with either hand, and second, that the pupil understands the advantages to be gained and will freely persevere until he succeeds. Undertaken under these conditions, the triumph of the pupil over a bad habit is not simply praiseworthy but full of promise morally. Even from the practical side, the attempt is certainly important for those who are to teach writing, since most of their pupils are right-handed; and left-handed illustration of pen-holding and writing movements for these pupils is very ineffective.

FINGER MOVEMENTS.—The action of the first and second fingers and the thumb, is termed the "Finger Movement"; it is used chiefly in upward and downward strokes.

FOREARM MOVEMENT.—"The Forearm Movement consists in the action of the forearm upon its muscular rest near the elbow, the hand gliding on the nails of the third and fourth fingers. It may be employed in making strokes in any direction, but is especially adapted to carrying the pen rightward and leftward across the paper, and is most efficient in combination with the finger movement."

COMBINED MOVEMENT.—"The Combined Movement consists in the united action of the forearm, hand, and fingers, the forearm acting on its muscular rest as a centre, and sliding the hand on the nails of the third and fourth fingers, while the first and second fingers and thumb extend and contract in forming upward and downward strokes. This movement answers the requirements of business better than any other; it combines the free untiring sweep of the forearm with the delicate shaping powers of the fingers, securing ease and accuracy."

WHOLE-ARM MOVEMENT.—"The Whole-arm Movement consists in the use of the whole arm from the shoulder, the elbow being raised slightly from the desk, and the hand sliding on the nails of the third and fourth fingers." This movement is mainly used for striking large capitals. Its practice is highly beneficial, as it brings into free action all the muscles from shoulder to fingers.

Styles of Writing.—The particular end in view determines not only upon which writing movement the stress must be put for the time being, but also the style of letters. (1) Vertical writing is good for the health because the required front position is natural and easy, *i.e.,* the back must be straight and square and both eyes must be exercised equally. But by properly placing the copy-books, etc., the same results can be secured in slanting writing. (2) It has been attempted to show by rapidly moving rows of strokes right and left in front of the eye, that slanting writing produces interference of light-rays, and that this injures the legibility; but this rapid moving does not really take place in writing, and is therefore not an argument against slanting penmanship. (3) Vertical writing is more rapid, because there is less distance for the pen to travel in making vertical strokes than in making slanting strokes of the same height. This, however, is true only for those who have not become habituated to the slanting style. For persons who have firmly acquired the slanting habit the vertical effort will be harder and slower for a long time. In view of this fact only beginners, as a rule, should be taught vertical writing if it is to be taught at all. Where vertical writing has been forced upon persons who grew up in the slanting style, it has almost invariably run by reaction into a "back hand" style, than which there could be nothing worse for both writer and reader. The complaint of business houses that clerks who had acquired the vertical habit after the slanting habit write slower than clerks who write only slant, and that the objectionable "back hand" is usually developed, has led cities who had introduced vertical writing wholesale to abandon it. In such cases the blame of course must be put not upon vertical writing as such, but upon the insanity of forcing it upon the firmly formed slant habit of the higher grades. (4) Vertical writing is said to be easier to teach and learn, because the positions of the body, hands, and eyes are perfectly natural to the child, and consequently do not have to be painfully inculcated. Statistics, it is said, show that children have better success in the vertical efforts, and that this success is a constant stimulus.

Against the use of vertical writing in the public schools the following arguments must be brought: (1) Vertical writing reduces to dead uniformity the expressive individuality of which the free poise of slant is capable. (2) The poise of the classical slant is as irresistibly charming as the wave in the field of golden grain. (3) "Shorthand" and "typewriting" have largely supplanted ordinary writing as a useful art. This fact weakens the only arguments in favor of vertical writing which deserved serious consideration, and strengthens all the arguments in favor of slanting writing as a fine art and as an effective expression of individuality.

Courses in Writing

Genetic adjustment, coupled with culture ideals and necessity, should determine the courses into which the stuff of writing may be divided.

Course for Beginners.—(1) The average child, as statistics show, cares less for writing than for drawing. The teacher must depend almost wholly on "borrowed interests," such as story-telling with the pencil, "imitation of custom, excellence in competition, and the like." (2) The course for beginners should therefore include such word-writing and letter-writing lessons as can be easily coupled with first lessons in reading. Large letters, legibility, and hygienic propriety should be the only definite aims.

Intermediate Course.—(1) Although linear analysis and synthesis have no charms for concrete-minded childhood, they can be made attractive to the boys and girls of the grammar grades. This is also the period of life in which accuracy is important in culture, and when sufficient skill in writing should be acquired for the ordinary business of the school and life. (2) The course should accordingly combine theory with practice. Accuracy and rapidity as well as beauty should be coupled with legibility and health as aims. The larger movements so necessary in the course for beginners should gave way to convention. In linear analysis and synthesis the claims of apperception should be recognized at least in the rough.

Higher Courses in Writing.—(1) The claims of individuality and vocation should rule in mapping out the higher writing courses. (2) Ornamental penmanship, business forms, and the like may be taken up accordingly.

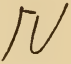
TEACHING WRITING

Both the learner and the lesson must be taken into account in deciding upon methods.

Preparation.—(1) In addition to the special training which the writing teacher may have, he needs a definite aim for the daily writing period, a working-plan, plenty of practice, and such material conveniences as blackboard, slates, paper, etc. (2) As a rule the only preparations to be required of writing classes are cessation from other work, preparation of board or desk for work, supply of needed materials, attention to directions.

Recitation in Writing.—As in other studies, writing recitations are of great importance, and the stuff of the lesson determines its special features.

Importance of Recitations.—In any good school the cultural interests of the curriculum are best served by combining writing with the preparation and the recitation of lessons; but, being subordinate to other interests, such writing fails to call the pupil's attention to writing as writing. As a writing exercise such writing is therefore not specialized effort, and tends to be slip-shod as to accuracy and other perfections. Inasmuch as such writing cannot as a rule be accompanied by special instruction on writing as writing, the writer is likely to fall into bad writing habits.

Beginners in Writing.—(1) As a rule the pupil should learn to write while he learns to read. If, as urged, the first lessons in reading are taught by writing the words to be learned on the board, the attention which the pupil gives to the writing of the words and without which the pupil could not learn to distinguish written words from each other, will impress the writing of the word so vividly upon the mind of the reading pupil that, usually, he can write by imitation what the teacher writes often. (2) In this word-imitation the attention of the pupil is, however, not analytic enough to emphasize the distinguishing features of the separate letters, as b, r, w, etc. The necessary analysis can be introduced by calling attention to the defective letter and writing it large and its linear parts separate, as  No technical description should accompany such analytic presentation of separate letters. Enough practice will of course make the learner perfect. And thus perfected the letter will become the writing rule. (3) The only perfections on which the teacher should lay stress in these beginnings are the pupil's health and the legibility of letters. (4) To satisfy the earlier ripening of power over large muscles the writing pupil should be required to use the blackboard at first. The ruled slate should follow, and then paper with pencil. When enough hand-control has been acquired pen and ink should be substituted for the pencil. By and by, to develop freedom of motion and to relieve the monotony of things, movement drills on the board and paper should be given. The detailed directions are usually found in copy-books.

Copy-book Classes.—The "copy-book" with its apperceptive succession of correct settings came to take the place of the older makeshift copy-books in which neither the succession of tasks nor the letters of words set were correct. The purpose of the ready-made copy-books is to perfect practice in writing by combining with it a preparatory analysis of the "set words" into their linear elments. Before such a recitation begins, the pupils of the class should be seated "front position" at the writing desks with pen, ink, paper, and copy-book ready for work. (1) Instead of permitting each pupil of the class to write the page without instruction, and therefore without a knowledge of the purpose of the page, the teacher analyzes and explains the new words of the page, the pupils answering such questions as the teacher may combine with his writing illustrations. When this preparatory analysis and instruction are omitted the pupil, ignorant of the purpose of the page, usually writes the next line worse than the one before as he passes down the page and farther from the "copy," and reaches the last word with this impression uppermost on his mind, that he has written another page. Nothing could be a worse waste of paper, time, and energy. (2) When the teacher has consumed, let us say five minutes in these preparations of the pupil's "head," he prepares the pupil's hand for beauty-work in the copy-book by requiring him to practise the analyzed and illustrated letter combinations on paper specially kept for the purpose. Five minutes of such preparatory practice should be very effective. (3) Assuming that the preparatory practice has made perfect hand-control likely, the class is finally requested to write the page, keeping the purpose of the page in mind, and trying hard to write each line more completely like the "copy." (4) If thirty minutes are to be devoted to three copy-book classes, the teacher beginning with the highest class, this class will have twenty minutes for beauty-work, the next class fifteen and the last ten. (5) After instructing each class five minutes, the teacher will have fifteen minutes left to use in keeping the class in the best possible writing mood. To secure this hand-inspiring mood the teacher must combine encouraging words with his inspections of copy-work. (6) The free-arm movement exercises so necessary for perfection in writing should of course be added every now and then, the board being the best writing surface for such work. (7) If time permits and the circumstances warrant it, ornamental penmanship may be attempted by the most advanced pupils of the school.

Value of Writing

In the hands of a trained teacher writing becomes a most effective educational means.

Culture.—Writing lessons afford very excellent opportunities for exercise in self-control, attention, accuracy, and artistic finish. There are so many combinations of body and mind both in school and life like the writing combinations that excellencies acquired in writing-lessons are a promise of similar excellency in all similar combinations of body and mind. The radius within which the similarity may be expected is as wide as the possibilities of motor-expression.

Life.—The effectiveness of writing-lessons as a qualitative training in motor-expression is recognized by most of us though the above explanation may not have occurred to us. The widely prevailing belief that, except in case of deliberate acting, most persons photograph their ordinary character in their handwriting, is therefore well founded. (1) Employers looking for self-poise, energy, taste, and manliness in candidates for employment often detect these qualities, or the opposites, in the letters of such applicants, and decide accordingly. School directors, for example, may not themselves be able to write well, but many of them know how important it is that the teacher of their children should not only write a good hand, but that he should also have the qualities of character which such efficiency somehow seems to guarantee. (2) What is true of business intercourse is equally true of written social intercourse. We think better of our correspondents when they write a legible and artistic hand. This preference seems to rest on the belief, though it may never have been put into so many words, that our friends are likely to resemble their writing in other respects and in their relations to us. Criminal justice has often been able to narrow the search for unknown fugitives from justice by expert opinion on handwriting.

Training of Teachers.—It is obviously the duty of the common school to cultivate penmanship both for its disciplinary and its practical worth. Teachers have no moral right to neglect either their own handwriting or that of their pupils. The consequences of such neglect are too difficult to correct, and too far-reaching in final effect. It is requisite, therefore, that teachers understand (1) the theory of penmanship, and (2) the theory of teaching penmanship. In addition to such understanding, it is necessary that teachers have artistic ability in penmanship. Indeed, a knowledge of higher courses in penmanship, and training in each of these courses, so far as possible, develops an appreciation for the art of penmanship, and leads to an ability in it that fits teachers to work from better standpoints and to much better advantage. The Normal Schools in particular owe it to the public schools to send out teachers that are able to write and to teach writing.

History of Writing

The art of expressing thoughts by means of conventionalized pictures is as old as civilization. Alphabetic writing began with the Phœnicians. All the European nations beginning with the Greeks and Romans wove this art intimately into the processes of education. Even now when shorthand and typewriting have so largely superseded its utilitarian applications, it continues to be inseparably bound up with the processes of school education.

Styles of Writing.—The earliest writing style was the vertical letter from which the present print-forms have been developed. "It was not until the beginning of the sixteenth century that the sloping or Italian style was invented by Aldus Manutius of Venice. It soon became a fashionable fad and spread rapidly over all Europe. Probably the best reason for this was that writing in those days was to a great extent in the hands of professional scribes, and, as the slanting style was peculiarly favorable to the development of the new art of flourishing, it soon supplanted the old vertical mode." "In the course of time, when education became the common possession of all, slanting writing retained its supremacy unchallenged. No attempts were made to return to vertical penmanship until a few years ago, when an investigation of the causes of curvature of the spine and imperfect vision so common in school children was instituted in Germany, with the result that eminent medical authorities attributed the greater part of the evil to the position of the body and eyes necessary in writing a slanting hand. At about the same time teachers began to awake to the fact that the writing of their schools was anything but satisfactory. With the assurance from the medical profession that slanting penmanship produces deformity and imperfect vision, and from educational experts that vertical penmanship is far superior to sloping," it seemed certain for a while that vertical writing would be the writing of the future. It was extensively introduced on the Continent and in England, and only recently aroused absorbing interest in America. The later statistics show that the evils attributed to sloping writing were largely imaginary and that vertical writing lacks individuality. The necessarily intimate correlation of writing with the processes of school education considered in connection with the commercial depreciation of writing, requires that writing should be taught rather as a fine art than a useful art, and that as a consequence, slanting writing with its almost boundless capacity for beauty and expressive individuality, should be preferred to vertical writing.

Supplementary Reading.

1. Hand Writing and How to Teach It. Gordon.
2. Theory and Art of Penmanship. Crosby and Nichols.

CHAPTER IV

SPELLING

Nature

The system of sight symbols, or letters, used to represent the elementary sounds of a language is called the " Alphabet " of the language.

Orthography.—The conventional representation of a spoken word by means of letters is called Orthography, from the Greek words *ὀρθός*, correct, and *γράφω*, I write.

Spelling.—The process of naming or writing in correct succession the letters used to represent the sounds of a spoken word is termed Spelling.

The Stuff of Spelling

The determining " stuff " in the spelling process is the alphabetic structure of a word.

Alphabetic Structure of English Words.—While there are about forty elementary sounds in the English language, the English alphabet consists of only twenty-six letters.

Arbitrary Orthography.—As a result, some of the letters must be used to represent more than one sound. This is particularly true of the vowel letters; of *g, s,* and *x;* and of combinations like *th,* etc. For reasons explained in the history of the English language, some of the sounds of the language are represented by more than one letter or by a combination of letters, like *gh,* for *f;* a number of combinations like *eigh, ough,* etc., sometimes represent one sound and sometimes another; and in various combinations letters have become superfluous or silent. In short, English orthography is largely arbitrary.

Rules of Spelling.—Distressing as English orthography may be, it is comforting to find that the combinations to be made most frequently are controlled by very simple rules.

1. Final *e* is usually dropped before another vowel, and retained before a consonant, as in skate, skating, and state, statement. Some exceptions are peace, peaceable; judge, judgment.

2. After a consonant, final *y* usually becomes *i* before a suffix not beginning with *i,* and remains *y* after a vowel, as in lady, ladies, and chimney, chimneys.

3. A final consonant after a single accented vowel is usually doubled before a vowel, as in control, controlling; prefer, preferred.

4. A final consonant after more than one vowel is usually not doubled before another vowel, as in repeat, repeating, and reveal, revealed.

5. A final consonant after a single unaccented vowel is usually not doubled before another vowel, as in cancel, canceling, caper, capered.

6. In monosyllables final *f* and *l* are usually doubled after single vowels, as in staff, ball, etc.

7. In words like *conceive* and *belief, c* is usually followed by *ei,* and other letters of the alphabet by *ie,* as in receive and retrieve.

8. Words relating to matter end in *ceous,* and others in *cious,* as in cretaceous, ferocious.

Object of Spelling.—Spelling is taught almost wholly in the interest of the writing process. It is through spelling that the alphabetic structure of words becomes a mental habit, thus saving much valuable time in the art of writing our thoughts.

The Psychology of Spelling.—There are two things which complicate the committing of the alphabetic structure of English words very much. The first complicating element is the arbitrary character of English words; the second is the possibility of interference or confusion of impressions.

OBSERVATION.—(1) The arbitrary character of English words makes the committing process very mechanical, *i.e.*, the memory must work without the strong support of reason. While this is a real difficulty, it is not really serious as compared with telegraphy, shorthand, etc. The really serious thing in learning to spell is the possibility of interference or confusion of impressions. Such interference or confusion of impressions occurs when the senses are defective, when attention is weak, when the word to be committed is not easily distinguished from another word, when the mind is allowed to dwell on the incorrect instead of the correct alphabetic structure of the word, when the repetition is insufficient, etc. It is therefore important, as the tests of specialists clearly show, that the senses of the learner should be well guarded, that his attention should be perfected, that correct impressions should be often repeated, that confusing homonyms, confusing similarities, confusing simplifications, and confusing false spelling, should be scrupulously avoided in spelling-lists.

INDUCTION.—The habit of attention can be cultivated and the sense of certainty promoted by teaching those rules of spelling which control frequently necessary combinations. Reason is thus compelled to support memory and to save it from slavery.

DEDUCTION.—The sense of certainty can, however, be developed only by abundant use of the rules of spelling. The somewhat limited sphere to which the rules of spelling apply makes the prevention of confusion in committing words the one supreme consideration. If this point is kept securely in mind, the pedagogy of spelling loses its terrors.

TEACHING SPELLING

The alphabetic character of the words to be spelled and the psychophysical character of the committing process determine the sequence and character of assignments, the special features of methods to be employed, etc.

Assignments.—While the sequence of assignments in spelling, as in other studies, should be apperceptive, the assignments themselves should be determined both by the pupil's necessity and the teacher's resources.

APPERCEPTION.—English orthography, as the history of the language shows, is very largely the result of derivation and inflection. The arbitrariness of English orthography is confined almost exclusively to the Anglo-Saxon stock of words. The foreign admixture of arbitrary words is not serious. A very large number of English words consist of a comparatively small stock of syllables always spelled the same way, as *fer, ing, ed, ment, sion,* etc. Any one who has learned to spell the words which can be apperceptively composed of the Ward phonograms is master of a very large working vocabulary. Spelling lists should also consist of word collections so arranged as to reveal those rules of spelling which control the frequently necessary combinations of English spelling.

Course for Beginners.—(1) So far as is consistent with the above requirements of apperception, those words which pupils meet in reading and need in the work of the grade to which they belong are the only words that should be spelled the first three or four years of school life. (2) After that, and before the daily program becomes crowded, the words which the pupil will shortly need in the higher grades up through the high school, etc., should be gradually mastered. Unless this work is largely done before the high school is reached, the necessity of conquering pages of thought will make it quite impossible for students to attend sufficiently to spelling. In the attempt to crowd the special recitation in spelling out of the weekly program, or shortening the time devoted to the special recitation too much, the school world has lately been guilty of neglecting spelling, and is suffering the punishment that is due to the guilty.

The Spelling Book Course.—To banish the "spelling book" from the school room just because it has been abused is certainly inconsistent with its possibilities. (1) Written by the specialist, the spelling book becomes the graded collection of words which the course of studies makes necessary. With due regard to the requirements of apperception and the needs of the course of studies in our schools, the spelling book ought not to contain more than about five or ten thousand of the two hundred thousand words defined in the Century Dictionary. And this list can be made to include practically all the difficulties of English orthography. Such a prepared list is certainly a great convenience to the busy teacher, and saves the pupil from the indiscriminate list so often inflicted upon classes by amateur teachers. (2) The spelling book also brings the list within proper range of sight, and thus prevents the eye-strain so often resulting from the long-range copying of black-board lists. (3) Then, too, the spelling book serves as a stimulus to spelling, because the subject is thus honored like other subjects, such as grammar, history, etc. Statistics show that both teacher and pupil neglect spelling as spelling when the spelling book is banished. (4) To avoid the abuse to which the spelling book has so often been subjected, sentences consisting of the listed words should be found on every page, and these as well as the lists should be dictated to the class. By combining the meaning with the spelling of the words, these "dictation" lessons make it almost impossible to go too rapidly through the book for the grade-needs of the pupil. This was the abuse which brought the spelling book into bad repute. (5) Finally, by giving the pupil specific directions for the study of the words and sentences in the spelling book, as Mr. Ward and other recent authors do, right psychophysical habits of studying spelling can be cultivated.

THE NEXT LESSON.—The next spelling lesson should have the most obvious connection with other school work already performed or presently to be performed by the class. It should not only be possible for the average pupil of the class to prepare the lesson, but to do so without waste of valuable school time and school energy. The investigations of eminent specialists show that, other things being equal, those pupils who devote less time to special lessons in spelling spell almost as well as other pupils because all school work affords more or less exercise in spelling; that the only justifying reason for special spelling lessons is the power which such lessons have to develop general attentiveness to the alphabetic structure of words, and that this effect can be secured by short lessons and short recitations as well as by longer ones; and specifically that ten or fifteen minutes a day is all that the average pupil can afford to devote to special spelling lessons.

Preparation for the Recitation.—It is of the utmost importance to make certain preparations for the spelling recitation.

PREPARATION TO TEACH A SPELLING LESSON.—The teacher should be sure that he knows the correct pronunciation of the words to be spelled, and he should cultivate pronouncing skill. These preparations will enable him to assign lessons and to dictate them effectively in recitations, so as not to leave confusing impressions in the minds of the learners. The teacher should, of course, also be prepared to define and illustrate the meaning of words whose spelling depends upon the meaning.

THE SPELLING PUPIL LEARNING WORDS.—(1) In committing the conventional alphabetic structure of English words we often fail to bring arbitrary letters, repeated letters, and silent letters definitely into the field of the senses employed. These indefinite impressions interfere with each other in the mind and produce confusion of associations, thus keeping the desired word-structure from becoming a " smooth path," or perfect mental habit, through the number of repetitions that should usually produce these results. Such confusion, whether it amounts to deficiency, indefiniteness, or interference, should therefore be made as unlikely as possible in preparing spelling lessons. (2) Having taken the necessary precautions against confusion, the next important thing in committing alphabetic structure is enough attentive repetition to produce the desired perfect mental habit. (3) In order to save valuable school time commonly eaten up by the repetition work which produces perfect habit, that combination of senses which is most effective in memory work should be cultivated in preparing spelling lessons. Expert investigations show that for the majority of pupils the most effective way to learn to spell a word is to copy it repeatedly, and preferably from a script "copy," thus combining sight with the muscular sensations which the writing movements produce not only in the hand but even in the vocal and auditory apparatus.

Ordinarily the likelihood of confusion is eliminated and enough attentive repetition assured by requiring pupils to copy repeatedly the words assigned and also the sentences into which the spelling book should build these words at the bottom of the page. Spelling books not constructed to meet these requirements should be discarded.

When the practice just recommended is ineffective, obedience to the following rules should be cultivated in preparing spelling lessons. (1) Find the letters of a word in their order with the eye. When this analytic attention has become habit arbitrary letters, repeated letters, and silent letters will be definitely associated. (2) Copy the word rapidly first "at sight" and then "from memory." Do this repeatedly, thus developing ease, speed, skill, and momentum in the alphabetic structure as a mental habit. When this synthetic attention has become a habit, the spelling mind is likely to run in "smooth paths" in writing out thoughts. (3) Compare the copied word letter for letter with the book word, thus compelling the mind to dwell longer upon the alphabetic structure and adding repetition to repetition. (4) Associate the correct pronunciation of the word with seeing, copying, and comparing. Do this consciously, but not necessarily aloud, thus compelling the vocal and auditory apparatus to support the committing process.

Spelling Recitations

The ends in view in teaching spelling are best served by a combination of incidental and special exercises.

Incidental and Special Spelling.—A certain amount of preparatory and corrective spelling combined with all school work keeps the mind "on the lookout" for hard words. When this alertness becomes habit, special spelling recitations will need to occupy less and less time. Nor will such "incidental" spelling encroach much upon the time of other school work if the teacher is really an effective teacher. And yet as already explained, special spelling recitations consuming only a minimum of time serve as effective stimuli to spelling, and, when properly managed, afford effective exercise in spelling. Whether incidental or special, the spelling may be oral or written, according to the purposes to be accomplished.

Value of Oral and Written Spelling.—The fitness of means to ends determines the educational value of any exercise. In spelling recitations the special ends are these: (1) to make effective attention certain, (2) to conquer the "stuff" in question, and (3) to serve the purposes of life.

STIMULUS TO ATTENTION.—(1) In oral spelling, as explained, pupils should be required to stand; this requirement relieves the monotony of sitting still in the seats, and thus pleases pupils. (2) Oral spelling affords pleasure to younger pupils by affording them an opportunity to use their voice. (3) United with the good mood into which standing and speaking as motor-opportunities put younger pupils, an appeal to the strong competitive instinct by means of a well-planned "trapping" system, will generally assure perfect attention to every word in question.

For older pupils, in whom as a rule, the motor and competitive instincts are less assertive, written spelling is the only perfect guarantee that every pupil spells every word. As a variety, even older classes may sometimes recite orally, but ordinarily written spelling should be substituted more and more as the class grows older.

Successful Memory.—(1) In the early school years the ear-impressions of normal boys and girls are more likely to be remembered than eye-impressions. Ordinarily the child avails himself instinctively of this advantage by trying to "study aloud" especially when committing something to memory. In other words, younger pupils are commonly "ear-minded" rather than "eye-minded" in memory work. For this reason *oral spelling should not only not be discarded, but preferred in the early school years.* (2) Then, too, the senses naturally support each other in most mental attacks. (3) In the cases of defective eyes, so common in our days, oral spelling is the necessary supplement or substitute.

(1) The fact that normally the pupils whose eyes are perfect have less trouble with spelling than those whose eyes are defective, and that deaf persons with good eyes learn to spell quicker than blind persons with good ears, together with the fact that normally most boys and girls become rapidly eye-minded in school work, indicate that *written spelling should be used increasingly more than oral spelling, even before the age of ten or twelve.* To adopt an explanatory metaphor from photography, the longer "exposure" of the word in written spelling normally makes the "after-images" of sight "stick better" than those of hearing where, as in oral spelling, the exposure is only momentary. (2) That the ripened perfect eye is more reliable than the ripened perfect ear is instinctively recognized in the well-known habit of proving the correctness of a word orally spelled by writing it afterwards "just to see how it looks," and further by the fact that those who spell

well orally do not always spell well in writing, while those who spell well in writing also spell well orally.

Economy.—(1) In the "incidental spelling" which must be so intimately combined with all school work oral spelling usually takes less time than written spelling. In the reading recitations of the lower grades, where spelling ability may fairly be taken as an index of ability in reading, and where the trapping system is well managed, oral spelling is a most effective stimulus to all-round industry and progress.

In the ordinary affairs of life we could almost dispense with oral spelling. With written spelling it is different; we need it almost every day, and in the most varied interests. The ability to spell orally is not, as was pointed out, a sufficient guarantee that a person can spell well in writing letters, etc. Correct spelling in written communications, as will be explained, is desirable both on its own account and for other reasons. In view of this practical importance of written spelling, and the fact that the large majority of boys and girls "stop school" before they can be graduated from the high school, it becomes necessary to substitute written for oral spelling as rapidly as the interests of perfect attention and successful memory permit.

Oral Spelling Recitation.—The importance of correct impressions through the sense of hearing, combined with enough effective repetition in the mind of every member of the class, makes a number of special features necessary in oral spelling recitations.

Getting Ready.—The oral spelling class should be required to stand rather than to take seats. The standing posture is a physical relief from seat-work, and is obviously more convenient when the trapping system is used. The posture should be both healthful and orderly, but not stiff and nerve-racking.

Giving Out the Words.—(1) The trapping system requires that the words be passed from "head" to "foot" in order. (2) The teacher can usually secure perfect attention by pronouncing the words distinctly and only once except for good reasons. (3) As an additional stimulus to attention the same word may be given by nod of the head or other appropriate signal to the next pupil just as if it had been misspelled. This device compels the pupils to be sure of every word, and by spelling it correctly to keep from being trapped. (4) When a word has been misspelled a new one may be given to the next pupil just as if the word in question had not been misspelled. The first pupil who spells the misspelled word takes his place above the one that missed it. The teacher should not give out the words in any order which might tempt the pupils to commit their "turns." (5) Words should be pronounced naturally, as in good reading, and not suggestively, as when the *a* in the word *orator* is purposely lengthened. (6) The teacher should not allow himself to fall into the habit of saying "right," "wrong," "next," etc. This habit is not only foolish, but tends to make spellers depend too much on the teacher's word. (7) When the spelling of a word depends on its meaning the word should be defined or its use illustrated in a sentence.

Spelling the Words.—(1) In oral spelling, the pupil should be required to pronounce the word before he spells, to make sure that the word was understood, thus preventing confusion, injustice, disputes, etc. (2) Younger pupils should pronounce each syllable after spelling it, thus impressing the word more effectively by analytic attention. To do this with long polysyllables is a waste of time, and quite unnecessary for pupils old enough to spell long polysyllables. A momentary pause after each syllable is sufficient to impress the word analytically. (3) The word should in all cases be pronounced again when fully spelled. This done, all concerned feel that the business is over, and that something else is coming.

Assigning the Next Lesson.—(1) It is not enough, especially with younger pupils, to close the oral recitation by assigning "the next twenty-five words." Unless the pupil knows the correct pronunciation of the words for the next recitation, he will go to his seat unable to combine the correct pronunciation of the word with his preparation of the lesson. In that event he loses an advantage in the mastery of the word itself, and comes to the next recitation unprepared to spell what the teacher pronounces. This is particularly true of words containing arbitrary or silent letters, as in else, phthisic, picturesque, etc. (2) The pupils should therefore be required to pronounce the new lesson before going to their seats, the words passing from head to foot. When the teacher must come to the rescue it should be by means of diacritical marks on the blackboard. The time spent is not lost.

Written Spelling Recitation.—The possibility of making the written recitation a perfect stimulus to faithful preparation, and a perfect means in developing rapid accuracy in spelling, is very great. The former effect is secured by leaving no room for hesitation in writing the words, and the latter by making indefinite and confusing impressions as unlikely as possible.

Getting Ready.—(1) For younger pupils the blackboard can be used to great advantage in written spelling recitations. This use of the blackboard brings the pupils into helpful social relations, affords motor satisfaction, and keeps the whole class under the teacher's eye. When the board is used the pupils should be required to pass quietly but erectly to the board, prepare it, write their names near the top to the right of the places to be used by each. When the signal is given, the pupils should face the board ready to write each word as it comes from the teacher's lips. The postures should be natural and graceful. No disturbing conduct should be tolerated, and absolute attentiveness should be the rule. (2) When slate and pencil, or paper and pencil, or pen and ink with prepared blank-books, are to be used, these materials should of course be ready for use. The pupils should be seated comfortably, temptation to copy and prompt should be made as unlikely as possible, and perfect quiet preserved.

Giving Out the Words.—(1) When everybody is ready,—and that should be without waste of time,—the words should be pronounced fast enough to allow the pupil no room for hesitation. The words should, of course, be pronounced correctly and distinctly, but only once, except for good reasons. For obvious reasons it is generally better that the teacher rather than a pupil gives out the words. As soon as the word has been written, some pupil ought to be requested to use it in an illustrative sentence, or to tell in his own way without delay what the word means. The teacher should have a stock of illustrations on hand. (2) To develop the habit of capitalization and punctuation, and also to keep from going through a spelling book too fast, the words should be given out not only as listed, but in sentences especially constructed for the purpose. The teacher gives out these sentences by reading parts at a time, or the whole, if possible, but leaving no time for erasures.

Writing the Words.—(1) Except in "Sentence" spelling, the words should be legibly written in columns from above and numbered. Only proper names should be capitalized, and no punctuation marks should be used after the words. (2) As soon as possible prepared blank-books, with pen and ink, should be used. This method effectually prevents erasures and "second trials," first steps to indecision and dishonesty. It also serves as a stimulus to faithful preparation of the lessons.

Corrections.—(1) The board, slates, or papers, of beginners, should be corrected by the teacher himself. Not to do so, is to expose the immature moral nature needlessly to the temptation of reporting mistakes falsely. (2) Older boys and girls should be required to "exchange" slates, papers, or books, thus exercising them in self-control and responsibility. The right of appeal to the teacher must be allowed when pupils do not correct their own lists, and the teacher should frequently, though not obtrusively, inspect the corrected lists to make sure of his pupils. (3) The advanced class should be required to correct their own lists, thus emancipating them completely from the teacher's moral supervision. But the pupils should be encouraged to hand the corrected list to classmates or teacher. Corrections may be made with crosses, figures, etc. (4) At the close of the recitation, the misspelled words should be recorded in a book kept for the purpose. If prepared blank-books are used by the class, the words may be correctly written by the pupil in the space following the misspelled word. This is the best method; it compels the pupil to correct confused impressions, and furnishes the teacher with the words that must be reviewed.

Spelling Reviews.—Misspelled words should be faithfully recorded and studied in order to correct the false impressions. When the teacher thinks best, the regular period for oral or written spelling should be used in part, or wholly, if necessary, to recite the words misspelled in the last week or two. Such reviews make it necessary for the pupil to study the very words which ought to be studied. The lists of words to be spelled in these review recitations may include words misspelled in reading lessons, compositions, examination papers, etc.; but should always be reasonable lists.

Spelling Matches.—Review recitations in spelling and other important spelling exercises may very profitably be converted into spelling matches. As a competitive exercise the spelling match is a powerful stimulus to prepare the list to be spelled and to alertness in class. But this introduction of the competitive instinct may harm the moral nature of the speller, and thus more than cancel the gain to spelling, by tempting to dishonesty and by causing bitterness. These effects can undoubtedly be eliminated by proper supervision, and such supervision is of course imperative. To this end, all disorder must be made impossible, and all conditions of the match, such as the words to be spelled, the rights of the spellers, the time to be given to the match, etc., must be fully understood by all. Nor should these matches be allowed to eat up time that properly belongs to other studies. When they do come, say once in three weeks, the last half hour of Friday afternoon may be used.

ORAL SPELLING MATCH.—When the time for the match has arrived two " captains " are " nominated " by the class and " confirmed " by the teacher. These step forward. After deciding which captain may choose first, they " choose sides," calling for contestants alternately until the " recruits " have all been " enlisted." Then the contest begins. (1) If the captain who had first choice in choosing sides, misses the word given to him by the teacher, he is " out " of the contest. The word is then passed to the other captain, and so on alternately until it is correctly spelled, all those missing it being " out," or " spelled down." This is known as the " Common Method." (2) If several persons on both sides miss a word, and those whose side finally spells the word correctly are allowed to remain in the contest, it is called " Saving and Out." The latter tends to prevent the " panic " which so commonly causes excitable spellers to miss words. This saving method prevents much of the nervous, noisy dropping out of line to which the Common Method gives rise.

WRITTEN SPELLING MATCH.—The written spelling match is not nearly as exciting; the " crises " come and go unknown to the class. And yet the ingenious teacher can infuse enough of the competitive impulse into it to stimulate grammar school and high school grades. The choosing of sides is the same as in the oral match. The spellers should be so seated that no two pupils of the same side are near enough to each other to provoke suspicion of collusion. The slates or papers should be passed to the nearest opponent for inspection. This opponent should be allowed to report the number of misspelled words, but the right of appealing to the teacher must be granted to the speller. The "reports" are placed on the board and added up for each side in full view of all concerned. The "additions" show which side is the winner.

Teaching Rules of Spelling.—Those eight or ten rules of spelling which so largely save the spelling memory, should be taught one after the other as soon as possible in grammar grades. The teaching process, as usual, should begin with observation, pass to induction, and end in deduction.

Observation.—When, for example, the rule for final consonants after accented vowels and before a vowel suffix is to be taught, the teacher writes four or five words of this class, like contról, defér, permít, etc., on the board, but in a numbered column starting from above. Back of each word he writes a suffix beginning with a vowel. Then he asks the following questions: (1) With what sort of a letter do all the words (control, defer, permit, etc.) end? (2) What sort of a letter precedes the final consonants *l, r, t,* etc.? (3) Which is the accented syllable of each word? (4) With what sort of a letter does each suffix begin? (5) Then doubling the final consonant in each word, the teacher calls attention to the fact, and asks what he has done.

Induction.—When the learner has seen what was done with these words, he is led to see that the same thing should always be done under the same conditions, and is then required to state this requirement as a rule.

Deduction.—In order to develop the rule thus taught into a mental habit, the teacher gives the class a number of words to spell, mixing those that come under the rule with others until he is satisfied that the rule has really become the desired mental habit.

Value of Spelling

The value of spelling depends upon its fitness as a means to ends in education. These ends, as in all tests of studies, are culture and service.

Culture. — (1) English spelling, largely because it is so arbitrary, helps to develop that associative memory so much needed in the daily program of busy people. As in daily tasks, so in English spelling, the next thing must be recalled as next not, as a rule, because there is logical connection, but simply because it is conventionally next. English spelling is really the only special provision in our school curriculum for this necessary kind of memory. (2) The possibilities for moral good or ill in spelling lessons are more like those of daily life out of school than in any other branch of study in the lower schools. As an appeal to the desire for "good standing," "trapping" tends to provoke envy, jealousy, etc., and thus tempts the speller to trample conscience under foot wilfully. And yet to dispense with this stimulus to spelling is a great loss to spelling at a time when progress in spelling is the measure of success in other studies. But this is really a valuable opportunity for the teacher. By accustoming the speller to submit to just conditions, whatever the resulting success or failure may be, the teacher really prepares the speller for many exactly similar moral situations out of school. The correction and report of errors, one of the most important necessities in teaching spelling, also becomes a valuable opportunity to accustom the speller to do what conscience says is right no matter what the heart may desire. The manner of supervising this opportunity has been explained. The appeal to the competitive instinct in spelling matches tends to tempt spellers to cheat as a "party" interest. The teacher who, through personality and justice of requirements, accustoms the sides to subordinate "party interest" to "party merit" prepares the pupil for similar serious moral situations in life. As an appeal to the "desire for success," both trapping and spelling matches accustom the will of the learner to master the details which help to win success. The habit acquired in spelling extends itself to life.

A SIGNIFICANT SKILL.—(1) What has just been explained also explains the high repute in which good spellers are held. The good speller becomes a good speller not only by exercising himself in associative memory, but especially also by attention to details, by mastering himself when tempted to cheat, by subordinating impulse to reason, etc. We like these qualities in our friends, in teachers, in employees, in literary masters, in scientific treatises, etc., and, whether justified or not in the assumption, we jump to the conclusion that when we have a good speller he has all these desirable qualities. (2) Then, too, bad spelling in manuscript and books is a mechanical offence to the reader. It makes us halt over words, and thus interferes with the process of getting "thoughts."

Training of Teacher.—The fact that spelling offers such large possibilities for good or ill, and that good spelling is so highly esteemed, makes the training of the spelling teacher very important. He should thoroughly master the psychology and ethics of spelling, and perfect himself in all the details of method. Sanity of judgment and feeling in the matter of the importance of spelling as a branch, is especially desirable in teachers, because of the effect such sanity will have on the teacher as a teacher and on the pupil as a pupil.

History of Spelling

The arbitrariness which characterizes English orthography is partly due to alphabetic necessity, partly to the composite character of the language, and partly to accident.

The English Alphabet.—The twenty-two hieratic characters which the Phœnicians, in the time of the Hyksos, or before that, borrowed from the Egyptian system, and converted into letters, and which were passed in succession to the Greeks, Romans, etc., were finally supplemented in number and modified in expressive power, until there were twenty-six English letters for about forty English sounds. The Roman missionaries were the first to reduce the Anglo-Saxon language to writing. "They used the Roman letters, in nearly their Roman value, and added new characters for the sound of *a* in *fat, th* in *their* (dh), *th* in *thine,* and *w.*"

A Composite Language.—(1) The four centuries of Roman sway in the British Isles introduced a large admixture of Latin into the English language. The final fusion of the conquering Normans with the conquered Anglo-Saxons brought additional admixtures into the English language. With the Latin and Norman admixtures came Greek and other admixtures, until the English language is very highly composite. The Greek and Roman admixtures are particularly large, as the result of their contributions to science, art, literature, philosophy, and law. (2) In the anglicizing process both the eye and the ear demanded recognition. The denotation of the composite word was to be obvious to the eye, and derivatives which threatened to be ambiguous to the ear were to be differentiated in spelling. These two considerations produced many digraph and other equivalents like *th, ph, ch, ps, sch,* etc.; many repetition-letters and silent letters to modify the representative value of adjacent letters, as in ball, state, etc., and many euphonic assimilations, as in suffusion, etc.

Effects of Accident.—(1) There was no authorized orthography for any word before the invention of printing. Writers spelled words very much as the mood of the moment dictated. Thus it happened that words were spelled differently by different authors, and that words were differently spelled by the same author at different times. To make the matter worse, the scribes that copied manuscripts were careless in spelling. There were some very remarkable exceptions to this rule. The spelling of the thirteenth century *Ormulum* was remarkably regular, and the author even urged his copyists to follow his orthography with utmost exactness. Chaucer, who wrote a century later, carefully revised his own works, and urged his scribe to "write more trew." The orthography of Shakespeare's times, though so much later than that of Chaucer, was far from settled; even the name of the great poet was written more than thirty different ways. (2) Even Gutenberg's invention of printing by means of movable types, in 1456, failed to convert chaos into order at once. Printers often spelled words as prompted by convenience of space, now adding a letter, now omitting it, to suit the case.

Publication of Dictionaries.—At last the era of lexicographers was ushered in. Reason rather than humor now began to determine the spelling of words. Dr. Johnson's celebrated dictionary, published in 1755, settled usage definitely in favor of some one of the numerous forms in which words were written, and thus removed the cause of confusion. In other words, Johnson's dictionary became a standard of English orthography. The great lexicographers, Noah Webster and Worcester, followed early in the nineteenth century. They adopted orthographic principles which met with almost universal approval. They not only exhibited the significance of composite words by conformity to primitive structure, but also reduced as many frequent combinations as possible to simple rules. The "Standard Dictionary," published by Funk and Wagnalls, and the "Century," both magnificent efforts, "prefer" the simpler to the arbitrary spelling of a large number of words in daily use.

Spelling Reforms.—More thorough-going spelling reforms than those of the recognized lexicographers have been attempted time and again. Among the first to attempt a phonetic system was Sir Thomas Smith (1568), Secretary of State to Queen Elizabeth. Eminent scholars in the time of Charles I. introduced orthographic changes, and tried to popularize phonetic spelling; but, inasmuch as these efforts did not rest in settled principles, the effects were not permanent. In modern times, Dr. Franklin invented a phonetic system, but it was imperfect, and he scarcely used it himself except in a brief correspondence with a friend. Among recent attempts is that of A. M. Bell. Many leading philologists of England and America advocate reform in spelling. The "Scientific Alphabet" suggested by Funk and Wagnalls in connection with the "Standard Dictionary," and consisting of the present alphabet plus three new letters, is very clever. The latest reform movement in spelling is known as "simplified spelling."

SIMPLIFIED SPELLING.—Agitations begun by the philological societies of England and America more than a quarter of a century ago led to the recent formation of a "Simplified Spelling Board," whose formulated purpose it is to rid our spelling of senseless anomalies and senseless appendages, thus simplifying and at the same time rationalizing spelling. And to make the simplifications still more rational, etymological principles are usually respected with philological faithfulness. This corrective purpose is in sharp contrast with the commonly revolutionizing tendency of all preceding phonetic reforms, and rather follows than leads reputable practice. Among the eminent members of the "Simplified Spelling Board" are Professor Brander Mathews, of Columbia University, the President of the Board; Professor Thomas Lounsbury, the most famous philologist in this country; Mr. Andrew Carnegie, who financed the movement; Mr. Samuel Clemens, otherwise known as "Mark Twain"; and Mr. I. K. Funk, editor of the "Standard Dictionary." The movement has the active support of President Roosevelt, the "National Educational Association," etc. Up to the present the Board has listed 300 words which anyone can secure by writing to No. 1, Madison Avenue, New York city. Among them are such words as esthetic, dipt, defense, etiquet, draft, thru, criticize, preterit, fulfil, dulness, program, esophagus, labor, fantasm, bur, center, surprize, simitar, catalog, and judgment. The words just quoted exemplify the 20 rules governing the 300 changes.

The Pedagogy of Simplified Spelling.—(1) As a pedagogical accommodation to the eye striving to know the meaning of derivative words the strict respect for etymological principles is simply admirable. Take, for example, the word *"rime,"* formerly spelled *rhyme* by confusion with the Greek word *rhythm.* (2) The simplified spelling of *cough, enough, plough, thorough,* and *through* is certainly less confusing than the old spelling, and for that reason more in harmony with the psychology of the committing process. The representation of five different syllabic sounds by means of *ough* in these words is only one example of the senseless combinations with which accident has burdened English spelling. If such anomalous orthography were an etymological suggestion to the learner's eye, the anomaly would be pardonable, but the very opposite is usually nearer the truth. (3) The substitution of "program," "catalog," "labor," "preterit," etc., for the older forms, thus ridding the words of encumbrances which affected neither the etymological suggestion nor the pronunciation, is for both reasons more rational, and therefore more pedagogical.

That there are limits beyond which the process of simplifying spelling should not attempt to go is very probably as evident to the eminent philologists on the Board as it is to the professional teacher. (1) The English language is full of words whose meaning is not known by pronunciation, as in *to, too, two.* In all such cases, the original differentiation in spelling to show difference of meaning to the reader's eye, was not only justifiable, but also absolutely necessary so far as the matter can be settled by pedagogy and practical convenience. (2) To avoid confusion in the representation of forty sounds by means of twenty-six letters, the lexicographers regulated the phonetic value of the ambiguous letters by placing modifying letters before them, after them, or both, as the case might require. Thus arose silent letters, as in mate, charge, notice; repetitions, as in ball, cheer, bidding; drop-letters, as in skating, judge; substitute-letters, as in ladies; and variable letters, as in receive and believe, cretaceous and judicious. The twenty rules of the "Simplified Spelling Board" show how much barbarous anomaly the older lexicographers have conventionalized in spite of better intentions. The "Board" has, however, gone practically to its limits in the process of simplifying our conventional spelling, as must be obvious to all who are qualified to judge. Further revision would encroach upon the very eye-helps which prevent confusion in the committing process, and would therefore be pedagogically wrong. (3) To extend the process of simplifying English spelling materially would also result, as specimen pages show, in a multitude of words so nearly alike in form as seriously to embarrass the reading process.

Delighted as teachers should be, on the whole, with the pedagogical merits of the 300 words listed by the Spelling Board, and anxious as we should be to see printers, publishers, and educational institutions adopt the recommended spelling, we cannot hope, confronted as we are by the insufficiency of the English alphabet and phonetic likeness of English words, to solve the most serious problems in the pedagogy of English spelling by simplifying spelling much further. The most serious problems of teaching English spelling will ever continue to be problems of necessary vocabulary, and the psychology of the committing process. Not reformed spelling, but the prevention of confusion in the committing process, combined with obedience to the laws of habit, both in the preparation and the recitation of the lessons, will bring us mental peace.

Supplementary Reading.

1. Pedagogical Seminary, December, 1906.

CHAPTER V

COMPOSITION

Nature

The process of expressing thoughts in related sentences is termed Composition, from the Latin words, *con,* together, and *pono,* I put.

Subdivisions.—(1) A composition making known in terms of sense the appearance or the nature of a thing in space, is termed Description. In other words, a description of a thing in space is to any of the senses what the photograph is to the eye. Persons, places, things, phenomena, etc., are the "things in space." (2) A description of events is termed a Narrative. The events may be real or fictitious. History, biography, novels, anecdotes, stories, etc., are narratives. (3) A written substitute for conversation is a Letter. Letters may be didactic, official, commercial, introductory, etc. (4) When the composition is a brief expression of opinion on an abstract subject, such as the value of athletics, or the need of school supervision, it is termed an Essay. A very systematic essay on a subject assigned as a test, or chosen for debate, is termed a Thesis. An exhaustive thesis, such as a text-book, is termed a Treatise. (5) A composition intended for hearers is termed an Oration. Speeches, addresses, lectures, sermons, etc., are species of oration. (6) When the ruling purpose is to tell ideal feelings in ideal language, the composition is termed Poetry. Rhythm, and sometimes rhyme, are among the linguistic devices of poetry. Expressive figures are employed effectively. Hymns are poems.

The Stuff of Composition

The "stuff" with which the pedagogy of composition must be concerned consists of the selecting of subjects, the making of plans or outlines, the gathering of materials, and the constructing of these according to the plan.

Selecting Subjects.—The selection of a subject for a composition determines what materials must be accumulated, and what plan of construction will be most appropriate, just as these things are determined by an architect. The materials and plans which will do for a story will not do at all for an essay, just as materials for a cottage—and a plan—will not do for a fortress.

SUBJECT RULES.—(1) Composition subjects should be "worth while," the dictate of "good sense," and "personally interesting." Empty subjects, foolish subjects, and distasteful subjects, should be avoided. (2) The subject should always be one that the pupil can handle—one on which he can find materials, one that suits his age and attainments. For a boy ten years of age such a subject as The Jury-System would be out of place, while Mary's Play-Room would hardly do for High School boys. (3) The subject should be chosen for a special purpose, either for the writer's training, as a test, or to serve occasions. Topics in politics would hardly do for Sunday-school addresses, while "Skating" would hardly be a test for Normal School seniors.

Making Outlines.—The plan to be followed in the structural arrangement of thoughts is sometimes called an "outline." Other terms are used, such as "skeleton" and "synopsis." The composer needs such an outline as much as the builder of a house needs the frame.

OUTLINE RULES.—(1) The kind of composition to be written determines the kind of outline needed. The outline for a description needs to be organic; that of narratives, chronological; while outlines for essays and orations must be logical in sequence. For illustrations the methods student is referred to his study of rhetoric or any up-to-date text-book on rhetoric. (2) A "collecting" outline is the first need. When the subject has been chosen, even a "rough outline" will keep the pupil on the track while employed in gathering materials. This is in every way desirable. (3) The writer, like the builder of a house, completes the undertaking by arranging his materials as required by an outline developed from the rough collecting outline, and then called the "writing outline."

Gathering Materials.—Writing compositions is like building houses. Materials must be accumulated, and prepared for special purposes. The materials for a composition are as follows: first of all ideas, then the words with which to frame the necessary sentences, and after that the sentences themselves, beautified by figures.

IDEA RULES.—(1) Only such ideas as relate directly to the subject should be cumulated. If, for example, Frogs is the subject, frog ideas are the ones to be cumulated. (2) Of those ideas which relate directly to the subject, the writer should try to use only such as suit his capacity. Only the maturer writers on frogs should attempt to use very abstract and generic frog ideas. (3) Of those ideas which relate directly to the subject, and which the writer is able to handle, only such as serve the purpose need be gathered. If the special purpose is to describe the anatomy of frogs, the writer should of course not cumber the occasion with ideas on the social habits of the frog.

MODES OF GATHERING IDEAS.—(1) If the subject for a composition is within the range of the senses, and is not too complex, as My Skates, the first thing to be required of the writer is that he "observes" as closely as he can. Ideas thus obtained are "first hand," and warm with interest. (2) To be able to "converse" with people who can give us "pointers," as we say, often makes the observation more effective, as in cumulating thoughts for a composition on a Motor Bicycle. (3) Books may be used to support the process of observing or conversing, as in working up an essay on Garden Fruits and their Insect Enemies. When observation is impossible, as in working up an essay on The London Fogs, "reading" may be the only recourse. (4) When the subject permits it, or requires it, "thinking" should be added to observing, reading, etc., as in getting ready for an essay on The Value of a Reputation, or for a thesis on The Proofs of Immortality. There is no real substitute for real, vigorous reflection. Nothing takes the place of original opinions, if indeed reason dictates these, and really appeals to reason in the reader or the hearer.

Vocabulary Rules.—In order to express himself effectively, the composition writer needs a large and choice vocabulary. Only pure words, proper words, and precise words should be employed. When these are the qualities of the words employed, the writer's "diction" is said to be good. (1) Even foreign words, like *quorum,* etc., are "pure" when they belong by adoption to the language employed by the writer. (2) A word is "proper" when it expresses what the writer or speaker intended to express, as when he uses the longer word "Esophagus" rather than "sarcophagus" in speaking of the throat, or the word "distinguish" rather than "extinguish" in referring to debaters. (3) A word is precise when it expresses exactly what was intended. Partial synonyms like kill and assassinate, shorten and abbreviate, etc., must be used with greatest care.

Modes of Acquiring Vocabulary.—The number of good words which many writers have at their command is very much smaller than it should be. Such a poverty of words is a serious handicap. Much can be done to remedy the trouble. (1) When the parents, teacher, and other associates use a large and effective vocabulary, the pupil almost unconsciously acquires this vocabulary for himself. New words attract the child's attention, and in younger years especially they stick to him like burs to the dress. It is therefore of great importance that the boys and girls should have the opportunity to be in company with those who speak the English language effectively. (2) The number of words at command can be rapidly increased by writing down the new words met in the daily lessons of the school. This practice acts as a stimulus to use the words, thus keeping them from slipping out of mind before they come to be a fixed acquisition. (3) When pupils reach the fourth grade, if not sooner, they should be taught how to use a dictionary containing at least 20,000 good words. The teacher should make it necessary for the pupils to look for the meaning of a reasonable number of necessary words every day. This practice will not only give the learner a larger command of words, but will also guarantee that the words are used with propriety. (4) It is possible to know the dictionary meanings of a word, and use it with impropriety or with lack of precision after all. In the upper grades, the high school, etc., boys and girls must therefore be required to read as many good authors as the library to which such pupils have access affords. The faultless propriety and precision with which the masters of English prose and poetry use words will in time become the power of those who accustom themselves to read such authors. (5) The study of a foreign language is a fine training in precision. The use of the lexicon accustoms the translator to select the English rendering which best expresses what the foreign author meant to say. The student who hopes to use English words effectively can ill afford to go through school without a thorough course in translating foreign languages. (6) The desire to "show off" tempts more than a few speakers and writers to employ the long and pompous words instead of the short and expressive ones. This tendency should be corrected by convincing the offender that the most effective authors and orators are those who cultivate the less pretentious Anglo-Saxon rather than the long composites. In the arts and sciences, however, it is seldom possible to be exact and reliable unless by means of these composite words.

Sentence Rules.—A sentence, like a house, should be first of all fundamentally correct. After that the words, phrases, and clauses, like materials used in walls, should be arranged to express most effectively the purpose of the writer. Free individuality determines what the actual arrangements shall be. Writers differ in the "style" of the sentences employed just as builders differ in the style of putting up a house.

Writing the Composition.—When an outline, or analysis, of a subject is followed, the completed composition will consist of paragraphs which as smaller composition-wholes make up the larger whole. The writer of the composition must of course complete the larger whole by completing all the smaller wholes in correct succession.

Paragraphs.—A Paragraph is a group of thoughts related closely to each other in succession and relating to a special point proposed for discussion in the fuller treatment of a subject. Grammatically a paragraph may consist of a single sentence. Ordinarily, however, this is the exception rather than the rule. In descriptive paragraphs adjectives appealing strongly to the senses should be used; in narratives short, rapidly moving sentences must be used to heighten the effect. When the paragraph is inductive, as in argumentative discourse, the statement of facts precedes the drawing of conclusions. In the deductive paragraph the statement of a principle is followed by the statement of its special applications. No paragraph should consist wholly of one kind of sentences. The "choppy" paragraph is almost as bad as the heavy "periodic" style. The paragraph may be too long or too short. The first line of a paragraph should begin an inch from the paper edge, the other lines half an inch, the right margin need not be straight, and a new paragraph should begin on a new line. The thought to be expressed, rather than the rules just stated, should control the writer's mind. And yet there are requirements to which effective construction of a sentence must conform. (1) The sentence should conform grammatically with the rules of agreement, as when plural subjects have plural predicates. This requirement is termed Concord. (2) It should be impossible to mistake the meaning of a sentence. This requirement is termed Clearness. To this end, the parts of the sentence must be so placed as to make their connections unmistakable, as in "I could see with half an eye that the room was swept." (3) The parts of a sentence which belong together should be closely dove-tailed. This requirement is termed Unity. To this end, the sentence usually begins with preparatory phrases or explanatory clauses, and ends with the principal assertion, thus avoiding "looseness." The rule applies especially to long involved constructions, as in Then, without precaution, and before the passengers became aware of the peril, he had put on all his steam and safely rushed the train across the yawning chasm. (4) When possible, certain parts of the sentence should be so conspicuously placed as to make the sentence as a whole an emphatic statement. This requirement is termed Force, and holds especially for sentences whose parts are capable of being marshalled into "balanced" opposition to each other, as in "Great was Diana," or in contrasts like "A good son maketh a glad father, but a wicked son is the heaviness of his mother." (5) When it can be done without sacrificing concord, clearness, unity, or force, the sentence should be so constructed as to please the ear. This requirement is termed Harmony. To this end, regulated accent, fluent word succession, alternation of the hissing and the liquid sounds, etc., are important. As examples take "The old man eloquent," "The light fantastic toe." For longer combinations see George Eliot's "Mill on the Floss," Longfellow's "Evangeline," etc.

Figures of Rhetoric.—Such is our nature that we nearly all enjoy occasional deviation from the ordinary. This is true in language as in other things. The deviation startles us, thus impressing more effectively the thing in question. Figures of Rhetoric, based as they are on unexpected likeness, contrast, and association, often help to make a sentence startlingly effective. A temperate use of Figures substitutes a charming vividness for the all-too-common "flatness" that distresses us so much in the untrained writer. Among the figures of rhetoric with which the composition writer should become acquainted very early in the course are the simile, the metaphor, and the personification. All the rest should be cultivated by and by.

Organic Parts.—To be formally complete, a composition must consist of an "Introduction," a "Body," and a "Conclusion." (1) The Introduction is the part in which the writer announces his subject and tries to win attention. Some writers do this by asking interesting questions; others use interesting statements, or startling anecdotes, etc. In any case the introduction should be courteous and dignified, brief and to the point. (2) The Body of a composition is the major part, the part in which the subject is discussed point after point as proposed in the analysis or outline. In descriptions the language should be vivid; in narrations the real sequence of events should be followed. To make the argument of an essay or oration just as cogent as it can be made from first to last, the language used must be just as perfect as it can be. Directness, conciseness, and evident sincerity, are often more effective than periodic roundness and florid fulness. (3) The Conclusion of a composition is the final part, the part in which the writer strives to leave a lasting impression. This is sometimes done by appealing to the feelings, sometimes by the use of a rising climax, or in argumentative discourse by briefly massing all the proofs in overpowering array. The language used must of course be suited to the purposes.

Mechanical Perfections.—(1) The "letter file," regulation size of paper is probably the best rule for school use in writing compositions. (2) In "one page" productions, the subject should be written midway between the margins on the upper line, an inch or more from the top of the sheet. When the upper and the lower thirds of the sheet have been folded over the middle third, the history of the production should be recorded cross-wise on the back of the middle third. (3) In the "many page" productions the history of the production should be recorded by itself on the first page. The outline, or analysis, should appear on the second page. The subject of the composition should be placed midway between the margins on the first line of the third page, as in the one page productions. The next line should be left unused. Paragraph rules controlling margins and lines should be strictly observed. Principal paragraphs should begin with headings underscored with two lines and followed by a period. Subordinate paragraphs should begin with headings once underscored, and under-paragraphs need no heading. Inside articles and prepositions of paragraph headings need no capitals. "Section headings" should be written on the second line from the close of a paragraph, and underscored with three lines, etc. The next line should not be used. New chapters should begin on new pages. Only one side of the paper should be used in compositions meant for printers.

TEACHING COMPOSITION

To reconcile the pupil's mind with the claims of apperception in assignments is the composition teacher's first and serious task. If he fails in this, both school and teacher, as statistics show, are very unhappy. The very opposite is wholly possible. Apperception determines the necessary succession of assignments, that is, composition-courses. The rapidity with which apperceptively necessary assignments should be made depends first of all upon the possibility of causing the pupil to do the work effectively, and then upon the needs of life.

Apperceptive Requirements.—(1) Ideas and the words with which to express ideas, are the pupil's first necessity. (2) With ideas and the words which express them at his command, he must learn to construct sentences. (3) Sentence exercises pave the way for paragraphs. (4) Exercises in outline-making, or analysis of subjects, paves the way for the use of paragraphs in compositions. (5) Lessons on rhythm and rhyme prepare the learner for poetic productions.

Adaptations.—(1) With younger boys and girls eagerness to express what they can be taught to think is of more immediate importance to development than perfect form. (2) The earlier assignments should accordingly be based almost wholly on instinctive development rather than upon the formal claims of apperception. Progress should therefore be from the simple and interesting to the complex and necessary.

Composition Courses

The preparatory course in composition,—the course in which the claims of apperception are recognized in their simplest and most interesting forms,—is commonly termed "Language Lessons."

Language Lessons.—Among the interests of childhood are sights, sounds, motions, pets, made things, events, pictures, novelties, relations, beauty, etc. And, as a rule, the desire to converse about interesting things is as strong as these interests themselves. (1) The course should therefore begin with descriptions of sights, sounds, motions, pets, made things, events, pictures, novelties, relations, beauty, etc. (2) Exercises in narration should often take the place of description. That is, there should be exercises in which the writer describes experiences, tells about events, reports conversations, plays biographer, etc. (3) Letter writing, based on interesting personal relations, should be introduced as soon as possible. (4) Delight in rhythm and rhyme, calls for lessons in these at an early age.

Coupled with these lessons, and based on many-sided curiosity, as well as on the sense of use and propriety, should be lessons on diction. These lessons should consist of finding and listing color-words, sound-words, motion-words, etc. Special lessons on sentence building, capitals, punctuation, abbreviation, quotation, paragraphs, etc., must of course be introduced as fast as necessary.

Formal Composition.—Language Lessons should be gradually merged into "Formal Composition." In other words, the rules of perfection in selecting subjects, making outlines, gathering materials of thought, building the vocabulary, forming the style, and constructing the composition as a whole, should be emphasized more and more. All the forms of description, narration, letters, essays, orations, etc., should be cultivated, and there should be rapid apperceptive progress from the concrete to the abstract, from the particular to the general, from the simple to the complex. "The useful" should be emphasized more and more in connection with "the interesting." The teacher should encourage "originality" in the productions, and subject them to more and more exacting criticisms.

Lesson Methods

Like any other art, the art of expressing thoughts must be learned by observation of ideal illustrations, and by long continued practice. This, of course, is the same as saying that the composition-teacher is a habit-builder. Instruction must accompany the illustrations and the pupil's practice. Self-activity must be encouraged and perfected.

Method in Language Lessons.—The foundations of language lessons are laid in the processes of teaching reading. In the third or fourth grade the pupil should be ready both in mind and sentence-building power, to begin the work of paragraph-construction. Ten or fifteen minutes should be given daily to the language lessons.

INTERESTING START.—(1) The first approaches to the tasks of composition should be just as innocent as art on the part of the teacher can make them. The teacher may, for example, tell the third grade reading class about some interesting sights, pets, etc., in an interesting way. The class may then be led, one by one, to tell what they saw, heard, etc., on this or that occasion. After that the teacher may step to the board and write what she said, and ask the class to write what each one said, or what any one was led to say. To be able to put the learners at their ease in these lessons, and to get them to succeed, is happiness both for the teacher and the class. (2) As a rule it is well to have the whole class write on the same subject. The competition thus set up acts as a stimulus to effort. When, however, the pupil desires to write on a subject selected by himself, the wish should be often gratified. The recognition of such initiative reveals individuality and promotes energy. (3) Both in description and narration the pupils may be helped by means of questions to find "something to say."

SENTENCE PERFECTIONS.—Capital letters, punctuation marks, abbreviations, quotations, margins, etc., should be taught at first by significant corrections coupled with skilful explanation. Presently some special lesson should be "driven home" every day for a while, until it becomes a part of the learner himself, and so on, week after week, lesson after lesson should be driven home until at last a sort of imitative perfection in the use of capitals, punctuation marks, etc., has been attained.

WORD HUNTS.—By telling the same stories first with a poor and then with a rich vocabulary, the teacher can lead the language class to feel the need of a richer and a larger supply of ready words. The class will then enjoy lesson after lesson in finding and listing color-words, sound-words, motion-words, etc. This exercise may be substituted once a week for the lessons in describing sights, Perry pictures, events, etc.

LETTER WRITING.—The writing of simple and interesting letters should be introduced as soon as possible. An interesting letter may be read to the class. The teacher may copy it on the blackboard, and talk about the heading, introduction, body, close, signature, and the address on the envelope. The teacher may suggest various interesting personal relations, and ask the class to write letters.

RHYTHM AND RHYME.—(1) Attention may be called to the rhythm and rhyme of poems in reading lessons. The pupils should be required to copy, commit, and recite poems that are suitable. To make these tasks delightful the poems used should be interesting in content. (2) Useful lessons in capital letters, punctuation, abbreviation, quotation, etc., can be combined with the copying of poems. By and by the children may be led to try to write little story poems.

CRITICISMS.—(1) When the children recite what they have written, they should be led to make criticisms on all sorts of points. If frank and free, and without bitterness, these criticisms will serve as a most effective stimulus to better efforts. (2) As a farther stimulus, the teacher should encourage the class to write so well that the products may be worth reading, recording, keeping, etc.

Method in Formal Composition.—In teaching formal composition, instruction and exercise must be so combined as to perfect and thus emancipate the learner in all his tasks.

SELECTING THE SUBJECTS.—In their early "teens" boys and girls grow confused and waste time if compelled to select composition-subjects. Nor are they ripe enough in judgment to select subjects in harmony with subject-rules. And yet, unless required to select for themselves, they may remain too dependent. (1) To prevent all such results, the teacher should propose two subjects and make each one attractive by means of questions, discussions, and instruction. After that the pupils should select for themselves. For comparison and stimulus the same subject must often be assigned to the whole class, but such suggestions and directions as may serve the purposes should accompany the assignment. Such class exercises should frequently give way to free selections. Unless this freedom is permitted, there may be too much repression of the individuality of pupils. (2) When the composition is to count as evidence of proficiency in any course of training, the selection of the subject should be submitted for approval to the person interested in the result, as in graduating theses. (3) By assigning related topics to the various members of a class, and choosing times for the reading of such productions, the teacher may make composition a valuable mode of instruction in the broader fields of knowledge, and at the same time add inspiration to the tasks of composition.

MAKING OUTLINES.—In the later "teens," when system and organic thinking become more and more important, boys and girls should be taught how to make and use composition-outlines. (1) The teacher may copy illustrative outlines on the blackboard and explain their use; or he may analyze chapters of a book into topics used by the author in his paragraphs, and thus form outlines; or he may take subjects for descriptions, narratives, essays, etc., and show the class how to construct outlines by asking questions and converting these into statements. The successive subdivisions should be suggestively placed and numbered. (2) To develop outline-making into perfect habit, composition-pupils should be exercised in copying suggestive outlines, analyzing lessons into outlines, and forming outlines on selected subjects. Outlines made by the pupils should be submitted to the teacher for inspection, criticism, and improvement. (3) The making and using of outlines both in collecting materials and for composition writing should become a perfect habit.

GATHERING IDEAS.—(1) The composition-teacher should illustrate the observing process very fully, and make this process necessary by assigning subjects for this purpose.

(2) He should illustrate the process of asking others for information that may not be attainable so effectively in any other way. The power to listen to readings and lectures and to report the same in outline or substance should be developed in the composition class. (3) The composition-teacher should illustrate the process of finding and consulting books, etc., that treat on given subjects. (4) The pupil should be habituated as much as possible to the right modes of cumulating ideas, until such cumulation becomes a pleasure.

Building the Vocabulary.—(1) Systematic efforts should be made to accustom pupils to the larger vocabulary of good speakers and good writers. (2) Teachers should urge pupils to own convenient dictionaries, and school boards to furnish unabridged editions for the use of the school. The alphabetic process of quickly finding words should be illustrated. The abbreviations and diacritical system used in the dictionaries should be carefully explained. The process of "looking up" the meanings of a word and selecting just the one that is needed, should be carefully illustrated. The habit of comparing synonyms and tracing etymologies should also be developed by and by. (3) The teacher should accustom his older pupils to read the classic authors, and call special attention to the rigid nicety of their most telling phrases. (4) Pupils studying a foreign language should be trained in the process of consulting lexicons, thus promoting precision in the use of English words and phrases. (5) That for ordinary purposes the Anglo-Saxon stock of English words is more effective than pompous classical derivatives, can be illustrated by comparing writers. These comparisons are most needed in the adolescent years.

Teaching Style.—(1) Lessons on style, like other lessons, should begin with blackboard and other illustrations. These illustrations, as in the case of the different kinds of sentences, together with capitals, punctuation, abbreviation, quotation, sentence-qualities like concord, clearness, etc., and figures of rhetoric, should be accompanied by effective explanation. (2) The things illustrated and explained must be built into perfect habit. To this end representative sentences, paragraphs, poems, etc., should be read, copied, committed, and recited. The attention and repetition thus required will in time make any perfection of style a perfect habit.

TEACHING THE MECHANICS.—All the mechanics of a composition must of course be taught in the same way as style. Illustrations must be accompanied by explanations. Practice must be supervised.

TEACHING ADVANCED CLASSES.—(1) The most perfect models should be used as illustrations in teaching advanced classes descriptions, narrations, letters, essays, orations, etc. These models may be found in the masterpieces of English literature, text-books on rhetoric, etc. The models must be studied critically and explained completely. (2) The high school should devote a good deal of time to social forms, business forms, official forms, etc., in letter writing. (3) In all written recitations of the grammar school, the high school, etc., topics may be so stated as to make it necessary for the pupil to express opinions in logical sequence. The written answer will be an essay consisting, let us say, of three or four related paragraphs. The mechanics of such work should be perfect. (4) For older boys and girls the conversion of poems into prose is an excellent exercise in sentence construction and paragraph building. (5) As an exercise in abstract reasoning advanced composition pupils should occasionally be required to expand maxims and proverbs into essays. (6) High school classes may take sides, and write debates on questions that provoke oratorical composition.

THE WRITING MOOD.—(1) Older boys and girls should be taught to put themselves into the mood to write. As a rule the only way to put one's self into the writing mood is to fill the mind with the subject. The person who is "full of his subject" finds it easy to write, unless indeed heat or cold, noise or lack of sleep, pain or fatigue, should interfere. (2) Older boys and girls should be taught to prune, correct, and rewrite their compositions with merciless severity before handing them over to teachers for inspection and correction.

Correcting Compositions.—(1) In the case of younger pupils all necessary corrections must be made bodily by the teacher himself; in the case of older pupils the teacher may use a system of abbreviations for the necessary corrections in spelling, capital letters, punctuation marks, indentions, purity, propriety, precision, concord, clearness, unity, force, harmony, figures, etc., and require the writers to make the corrections. The teacher should assure himself that all corrections are understood. (2) The composition should then be rewritten in a book, and kept for future comparison and stimulus.

Composition Day.—(1) As a special stimulus, a special day may be set apart every week or two in the higher grades, for the reading of productions before the school. (2) When the hour for the reading of the compositions has arrived, the class or school gives up all other work. One writer after the other goes forward to the platform of the school-room, and reads his production just as effectively as possible. Such applause as the audience thinks the production deserves may then follow. Suitable remarks and criticisms by the teacher are in place. Music and declamations may be added to the program. The exercise may close with the selection or assignment of subjects for the next "Composition Day."

The Value of Composition

Composition may be made a most effective means in education.

The Cultural Effects.—Judgment and individuality may be developed by selecting subjects; the power of analysis and logical relation by inventing outlines or plans of construction; the senses, reasoning, and memory by cumulating thought materials; taste and imagination by the use of figures such as metaphors, etc.; will and corrective patience in completing perfectly what has been planned; exactness and humility by the revisions and corrections that must usually be made.

Instruction.—(1) Pupils required to write recitations in the various branches of the school curriculum study harder, know more, and retain better, than others. (2) By supervising the selection of subjects and the cumulation of materials properly, the composition-teacher can use composition to enlarge the school curriculum most effectively.

Life.—Skill in composition is a valuable equipment for modern life. Ability in letter writing is a fine accomplishment, and a most important business education. The essayist has often been a stimulating educator. The thoughtful page, almost as much as the tongue of eloquence, moulds opinions, shapes policies, etc. The ready pen is among the most powerful agencies in modern civilization.

Trained Teachers.—The value of a course in composition depends almost wholly on the training of the teacher. To make him inventive enough, the composition-teacher must have had a thorough course in composition. Unless this course includes grammar, rhetoric, and logic, he will fail in teaching sentence construction, figures, outline-making, and logical discourse. What the composition-teacher needs most of all is a knowing mind, and training in the psychology of interests. Apart from these qualifications the selection of subjects and sequence of subjects will be misery both to himself and his pupils.

The History of Composition

Written exercises constituted quite a large proportion of the daily tasks at school among the Greeks and Romans. As a consequence they have given us immortal "literary forms." The Latin high schools produced by the Renaissance devoted enormous amounts of time and energy to composition in the interest of classic "eloquence," the dominating school ideal of the humanists for centuries. The "realism" of the last two centuries has placed the emphasis not so much on "perfect form" of expression as on "knowledge." Economic pressure has often caused composition to be badly neglected in American schools. This is unfortunate, to say the least. Perfection in the art of composition is, as shown, a worthy object; but this perfection is more difficult to attain than in almost any study of the schools. Above all this is the well known fact that composition writing is extensively interwoven with success in any course of study—an essential exercise in the acquisition of an education.

Supplementary Reading.

1. Essentials of English Composition for Elementary Schools. Shaw, N. E. A. Report, 1898.
2. Paragraph Writing. American Education, October, 1907.

CHAPTER VI

GRAMMAR

Nature

As already said, the stuff of any branch of study determines the mental action, the course of study, and the methods of instruction.

The Stuff of Grammar.—In the English language, as in all Aryan languages, inflections are employed to denote the offices and properties of words as names, and collocation to denote their relation in a sentence. These two aspects of language are so inseparable from each other and so separable from other aspects of language, as to constitute a special province of science. Emphasizing the inflection and collocation rather than the offices and relations of words used in the sentence, those who baptized the science named it "Grammar," from the Greek word *γράφω*, I write.

THE SPECIAL PROVINCES OF GRAMMAR.—(1) So far as grammar deals with the offices and properties of words as names, it is Etymology. (2) In employing inflections to denote the properties of words in sentences, grammar calls Orthography into service. (3) That phase of grammar which regards the sentence as a whole made up of words as parts, is known as Syntax, from the Greek words *σύν*, together, and *τάττω*, I put. In as much as syntax deals with relations, it belongs to Logic, the science of true relations, or reasoning.

DEFINITION OF GRAMMAR.—Briefly defined, Grammar is the science of the sentence, and the art of speaking and writing sentences correctly.

The Psychology of Grammar.—The nature of the mental action to which attack on the stuff of grammar gives rise determines the sequence of assignments in lessons, the necessities of method, and the value of the study.

DEFINITIONS.—It devolves upon the grammar pupil, first of all, to learn those important distinctions, called offices and properties, which words are made to express by means of spoken or written alterations called inflections. These distinctions must be illustrated and labelled, as in teaching verbs, tense, gender, etc. The concepts, or general ideas, thus learned and labelled must be mentally and verbally defined. This conceptive process is induction coupled with memory.

INFLECTIONS.—Those alterations of form to which words are subjected in order to denote the properties of words, must be observed in sentences, and built into declensions, conjugations and comparisons. The pupil must be made to understand that these inflections are the rules with which the words of a language are required to conform in denoting differences of person, number, case, etc. Thus far the mental action is inductive. For ready use these inflections must be committed.

SENTENTIAL RELATIONS.—The most important lesson which grammar teaches—the grammar lesson preëminent—is the sentential relation of words. Such relations as those of the subject to the predicate, of modifying to principal words, etc., often determine both the form and the place of words in sentences. Like other natural laws, these sentential relations are best learned by comparing instances, that is, by induction. For ready use in forming sentences, these laws of relation must be memorized into perfect habit.

PARSING.—The process of examining a word in a sentence to find its office and its properties is known as Parsing. The parsing process is a reasoning process, as in "Tell me," me is first person, because it denotes the speaker. This argument is equivalent to the deductive syllogism,

Genus 1. All words which denote the speaker are first person words.
Individual 2. In "Tell me," me denotes the speaker.
Conclusion 3. Therefore me in "Tell me" is first person.

Analysis.—The process of examining a sentence to find the relations of the words used as parts is known as Analysis, from the Greek words ἀνά, up, and λύω, I break. The analyzing process, like the parsing process, is deductive reasoning. To say that in "John runs fast," fast is an adverbial adjunct, because it modifies the predicate, is the same as the deductive syllogism,

Genus 1. All words modifying predicates are adverbial adjuncts.
Individual 2. In "John runs fast," fast modifies the predicate.
Conclusion 3. Therefore fast is an adverbial adjunct.

Syntax.—The process of denoting the compositional relations of words in sentences by means of significant forms and places is termed Syntax. The mental process of syntax is also deductive reasoning, as in "It is I," I must be I because it is the subject of the sentence. Fully stated the argument is a deductive syllogism, as,

Genus 1. All subjects of finite verbs are in the nominative case.
Individual 2. In "It is I," I is the subject of a finite verb.
Conclusion 3. Therefore "I" must be I, and not me.

This syllogism is an argument in "concord," but the collocation of words, phrases, and clauses, for clearness, unity, strength, and harmony, requires the same kind of reasoning.

TEACHING GRAMMAR

The problem of teaching Grammar involves both courses and methods.

Courses of Instruction

The nature of the stuff to be attacked, together with the nature of the necessary mental action, require grammar to be taken up in courses.

The Preparatory Course.—(1) As explained, the stuff of grammar is so abstract, and the necessary mental action consists so largely of reasoning, that the study should probably not be taken up seriously before the seventh grade, when the power to think the content of reading books has been pretty largely developed. (2) Only the simpler properties and relations should be taken up the first two years, and these should be taken up in strictest harmony with apperceptive sequence. When thus simplified in assignments and sequence, and illuminated by effective blackboard illustrations, grammar will be fascinating to the great majority of boys and girls who are ready mentally.

OUTLINE.—(1) The preparatory course should begin with the noun, verb, adjective, and adverb as parts of speech. (2) When the pupil has learned what nouns, verbs, adjectives, and adverbs are, he is prepared for lessons on simple subjects, predicates, and modifiers. (3) The sentence thus learned is the natural apperceptive preparation for all the other parts of speech. (4) The properties of all the parts of speech should next be taken up, care being taken to "make haste slowly," and to select the simpler properties at first. (5) To perfect the concepts taught into mental habits, property-lessons must early be coupled with informal parsing, analysis, and syntax. (6) The second year lessons should be given with sentences in which simple phrases and clauses are substituted for single words as subjects, complements, and modifiers. (7) The sentence-lessons of the second year should be worked more and more into practical connection with language-lessons. (8) The blackboard and the pupil's reader are to be preferred to a text-book in all the work of the preparatory course.

Intermediate Grammar.—(1) The preparatory course in grammar should be followed by a course in which system and completeness can be emphasized. (2) For these reasons this course should be a text-book course, so that lessons may be regularly assigned and prepared. (3) An elementary text-book, covering the work done in the preparatory course, but with more completeness and system should be used for a year or more.

Advanced Grammar.—(1) The elementary book should be followed by a text in which the needs of composition and the ends of culture can be emphasized. (2) High school grammar should be reinforced by the study of French, German, or Latin. (3) The complexities and anomalies of grammar should be reserved for the riper years of rhetoric, logic, and philology.

Elementary Grammar Methods

The abstractness of the stuff of grammar makes simplification the most necessary adaptation to the needs of the learner's mind.

Elementary Lessons.—(1) To be apperceptively effective the sentences used as illustrations should not be complicated by superfluous words. The sentences should be so placed under each other on the board that words to be compared stand suggestively under each other. To prevent confusion in attention the sentences should be numbered. (2) The concepts to be taught, such as tense, case, etc., should be taught by means of questions based on difference of spelling. The words to be used in teaching new concepts should therefore be suggestively different in spelling, and the difference should be suggestively underscored. When the learner has been led to see that some difference in spelling like *ed* denotes difference in time, he needs the label "*Tense*" for this new concept. He cannot be expected to invent this label. This is the "pedagogical crisis" of the elementary lesson. The teacher himself must come to the rescue. When the technical term, or label, has been furnished, the pupil must be led to state in his own words what he has learned. This inductive definition may be incomplete and defective, but is vastly more emancipating in effect than "ready made" definitions. (3) All the lessons should end in attempts on the part of the learner to find words in his reader and elsewhere that have the properties which he has learned. This process is deductive, and completes the lesson.

The "Noun" Concept.—(1) Which words in the sentences on the blackboard are the names of persons, places, or things, James? Box, apple, Mary, meadow. (2) Children, such names are called "Nouns." What is a noun, Alice? A noun is the name of a person, place, or thing. (3) Please pick out the nouns on page 15 in your reader, Peter.

The "Adverb" Concept.—(1) Which words in the sentences on the board qualify the verbs, Mildred? Slowly, sweetly, kindly, quietly. (2) Children, such words are called Adverbs, which means *added to* verbs. What is an adverb, Karl? An adverb is a word added to a verb to qualify the verb. (3) Please find the adverbs on page 20 in your reader, Emma. (The concept should be completed by means of sentences in which adverbs are added to adjectives, other adverbs, infinitives, and participles.)

The "Subject" Concept.—(1) Sentences such as Mary laughs, The apple fell, Snow melts, should be written under each other on the board and numbered. The teacher asks, Which are the words about which something is said in the sentences on the board, Olive? Olive says, "Mary, apple, and snow." (2) Children, such words are called Subjects. John, what is the subject of a sentence? The word about which something is said is the subject of a sentence. (3) Children, please go to the board with your readers, and write in a column the subjects of the sentences on page 20.

Presently the class must be led to see that phrases, clauses, and series of words, phrases, or clauses, may be subjects.

The "Predicate" Concept.—(1) Sentences such as Fire burns, Wind blows, Water runs, may be used as before. After asking the class for the "subjects" of the sentences, the teacher says, Which words tell something about the subjects of these sentences, Mary? The verbs of the sentences. What might we call such verbs, Jane? Telling words. Yes, Jane, but in grammar we call them Predicates. (2) What is a predicate, Olive? Jane? Roy? (3) The boys may write the subjects on page 10 of your readers, and the girls the predicates.

The "Modifier" Concept.—(1) Sentences such as Cold water quenches thirst, Blue-bells always please Mary, Do you hear the noisy wagons? may be used. When attention has been called to the subjects, predicates, and objects or attributes, the teacher asks, Which word describes the subject of sentence 1, Peter? The object of sentence 3, Jacob? The predicate of sentence 2, Charles? (2) What might we call words which describe or qualify or explain other words in a sentence, Nellie? We might call them explaining words. Yes, Nellie, but grammarians call them Modifiers, or Adjuncts, because they are joined to words which they modify. What is an adjunct, Mary? Since some of these explanatory words are adjectives and others adverbs, what kind of adjuncts might we call them, Charles? We might call them adjective adjuncts and adverb adjuncts. Yes, Charles, but the longer word adverbial adjunct is used for adverb adjunct. Mary, what is an adjective adjunct? What is an adverbial adjunct, Harry? (3) Please open your readers on page 15, and look for the adverbial modifiers and the adjective modifiers. Name the adjective modifiers, Harry? Name the adverbial modifiers, Mary? Which parts of these sentences have adjective modifiers, Kate? Adverbial modifiers, John?

Phrases and Clauses as Modifiers.—(1) Sentences such as The English people are patriots, The people of England are patriots, The people who live in England are patriots, should be written under each other on the board and numbered. The teacher asks, What words in sentence 2 serve the same purpose as the word English in sentence 1, Claude? The words "of England." Does this expression have a subject or a predicate, Harry? No. Such an expression is called a Phrase. What is a phrase, Mabel? Since "of England" takes the place of "English," what may we call it, John? An adjective adjunct of people. Which expression in sentence 3 also serves the same purpose, Maude? The expression "who live in England." Why is this expression a sentence, John? Because it has both subject and predicate. A sentence which is part of a sentence is called a clause. May only words be adjective adjuncts, John? Adjective adjuncts may be words, phrases, and clauses. (2) Please find such modifiers on page 10 of your reader. (Lessons on adverbial modifiers should follow.)

The "Preposition" Concept.—The first lesson on prepositions should be put off until the class has had several lessons on pronouns, adjectives, adverbs, conjunctions, predicates, and objects. As an apperceptive preparation for the first preposition lesson the class should be taught by means of illustrations that what one thing has to do with another is termed "relation," and that the word "govern" means to cause something to behave in a certain way. When these preparations have been made, there ought to be no difficulty. (1) Which underscored words in the sentences on the board express the relation between the predicate and a following noun, Ralph? The words in, into, from, under, over, and through. Between which words does *in* show relation? Into? From? Under? Through? (2) Children, because these relation words must be placed before nouns, or other words amounting to nouns, they are called Prepositions, meaning *placed before*. What is a preposition, Elmer? A preposition is a word which shows relation between other words in a sentence. (3) Please step to the board with your readers, and write the prepositions which you can find on page 13. Before and after each preposition, write the words between which the preposition shows relation. (The class of average ability can soon be led to realize that prepositions show relation between other parts of speech besides verbs and nouns. That English prepositions require the noun which follows, or the equivalent, to be in the objective case, can best be taught by using pronouns in the illustrations, because these differ more in spelling than nouns; but these lessons must of course be deferred until the "case" concept has been taught.)

The "Case" Concept.—Three short sentences like the following should be written under each other on the board and numbered: I like flowers, James likes my roses, James likes me. The words I, my, and me should be underscored. (1) Which word is the subject of sentence 1, Nell? The word I. Which word in sentence 2 denotes whose roses James likes? The word my. What is the word me in sentence 3, Peter? It is the object of likes. Do the words I, my, and me mean the same person or different persons, Miles? The same person. Why, then, are the words not spelled alike, George? To show that the same person is the subject in the first sentence, the owner in the next, and the object in the third. (2) Children, this difference in spelling is called Case. What is case, Calvin? Case is difference in spelling used for subjects, owners, and objects in sentences. What case might we call I, children, just because it is the subject? The subject case. Yes, John, but it is usually called the Nominative case. I will write the word. Please spell it, Jennie. Who can define the Nominative case? The nominative case is the spelling of sentence subjects. Can you say the same thing in other words, Mary? James? Peter? What might we call the "my," just because it denotes the owner or possessor, Jane? The owner case, or the possessor case. Yes, or as it is commonly called, the Possessive case. I will write it. James, please define the possessive case. What case might we call "me," Miles? The object case. Yes, but the longer word Objective is commonly used. Define the objective case, John. (3) For deductive drill the class may be asked to find sentences with I, my, and me on any page of their reader, and to exercise them in defining.

The next lesson should be given with sentences containing we, ours, and us. The six words should then be written on the board in two columns as follows, and committed:

Singular	Plural
Nom. I	Nom. We
Poss. My or Mine	Poss. Our or Ours
Obj. Me	Obj. Us

All the declensions should be taught in the same way, one after the other, and thoroughly committed for ready use in parsing. Much deductive work should be done at the board and with the readers.

The "Tense" Concept.—The construction of declensions paves the way for conjugations. The "time-forms," or tenses, should be constructed first of all. And since the time-forms of "am" and "have" serve as helps in the time-phrases of all other verbs, and those of "am" also pave the way for "voice," these words might as well be taught at once. (1) The first tense lesson may be taught with the following short numbered sentences written under each other on the blackboard. I am ready, I was ready, I will be ready. The words am, was, and will be, should be underscored. The teacher asks, Which words in the sentences on the board enable us to know the time of the fact expressed, Mary? The words am, was, and will be. Which of these words denotes present time, Roy? The word *am*. What times are denoted by the words *was* and *will be,* Amy? The word was denotes past time, and the words will be future time. (2) Children, this difference in word-forms denoting difference of time in verbs is called Tense. What is tense, Maude? What tense is *am,* John? Was, Kate? Will be, Harry? What is present tense, Roy? Past tense, Mary? Future tense, John?

The Person and Number of Verbs.—The next step to take is to change the subjects of the sentences on the board from I to thou, he, we, you, and they, making the necessary changes in the verb-forms. The teacher must carefully distinguish these changes in the verb-forms of any tense as person and number, and not "tense." The three tenses thus constructed should be thoroughly committed for ready use in parsing. (3) The usual recognition-work with readers must of course be connected with these lessons.

The first three tenses of "have" should now be taught in the same way. These lessons pave the way for the present perfect, past perfect, and future perfect tenses of "am" and "have." The teacher's rule should be to make haste slowly.

THE "MOOD" CONCEPT.—The first "mood" lessons, like all other first lessons in grammar, must be taught by means of simple and suggestive illustrations. (1) The following illustrations, for example, may be written on the board under each other and numbered. Roy is ready; Roy may, can, or must be ready; Roy, be ready; To be ready; Being ready. The words is, may be, be, to be, and being, should be underscored. The teacher asks, In which expression on the board is a truth stated as a fact or not doubtfully, James? In the first one. How is the same thought stated in the second sentence, Mary? It is stated as possible or necessary. What is the third statement, John? It is a command. How do the fourth and fifth statements differ from the first three, Robert? They are not sentences—they have no subjects. True, Robert, and for that reason these verb-forms have neither number nor person. (2) Children, this difference in verb-forms denoting certainty, uncertainty, command, and no subjects, is called verb-manner, or verb mood, or simply "Mood." Mary, what might we call the mood or manner of a verb used in stating or asserting facts, as in sentence 1? Perhaps we might call it the stating or asserting mood. Yes, Mary, but it is usually called the Indicative mood. What is the indicative mood of a verb, John? Kate, what might we call the mood of a verb used to state a possibility or necessity rather than a fact, as in sentence 2? The possibility or necessity mood? Yes, Kate, but grammar writers have agreed to call it the Potential mood, which means the same thing. Those who think they can define the potential mood may raise hands. Try it, John. In the same way the Imperative, Conditional and Infinitive moods are to be taught, care being taken to explain the difference between the "to" infinitive and the "ing" infinitive.

After this first mood lesson, "am" and "have" should be completely conjugated. The teacher should not attempt too much of this work in any lesson. Nothing that has once been learned should be allowed to be forgotten. The teacher should try hard to make these lessons thoroughly lovable.

When "am" and "have" have been mastered, a number of regular verbs should be completely conjugated in the active voice.

THE VOICE CONCEPT.—(1) The first "voice" lesson in grammar may be taught with, I love my friends, I am loved by my friends. The teacher may proceed as follows: Which word is the subject of both sentences, James? The word I. In what tense are both predicates, Ellen? In the present tense. If both predicates are in the present tense, why are they not alike, John? The first predicate represents the subject as the doer, the second predicate does not. (2) Yes, John, this difference may be expressed by saying that the first predicate is "active," and the other "passive," or not active. And because we use the voice to express this difference, putting stress on "am" in the second sentence, this difference itself is called Voice. What may we call the voice of love in sentence 1, James? The active voice. And what do we mean by the active voice of a verb, Jane? That the verb denotes the subject as acting. What may we call the voice of "am loved," Roy? The passive voice. Define passive voice, James. Please conjugate love in the present tense, active voice, John. Now write it on the board. Mary, conjugate love in the present tense, passive voice. (3) The whole class may now be sent to the board, and drilled in conjugating regular verbs in both voices of the present tense.

After this first "voice" lesson, a number of regular verbs should be completely conjugated in both voices, and the class should be made to see that the passive voice is always formed by adding the perfect participle to the "am" forms of all tenses, and that the "am" forms may be called "neuter," meaning "neither" active nor passive. This work should be divided up into many lessons, and much review work, together with parsing and analyzing of simple sentences found in the readers or invented by the teacher, should accompany the conjugating lessons. The teacher should try his best to make the lessons lovable.

Regular and Irregular Verbs.—(1) The first lesson on this difference in verbs should be taught with short sentences like James laughed and James sang. In what tense are laughed and sang, Mabel? They are both in the past tense. How is the past tense formed in laughed, Grace? By adding *ed* to the present. (2) Yes, Grace, and this is the usual or regular way of forming the past tense. What kind of verbs might we therefore call such verbs, class? Regular verbs. What is a regular verb, John? What kind of a verb might we call *sang,* Ellen? A not regular verb, I suppose. Yes, an irregular verb, Ellen. (3) Please take your readers and record all the irregular verbs on page 20, girls. The boys may record the regular verbs.

Principal Parts of Verbs.—Special lessons on principal parts of verbs should not be attempted until the class understands the conjugating process pretty fully, and has acquired a good deal of skill in conjugating verbs completely. To make it possible for pupils to conjugate any verb completely, correctly, and confidently without a teacher's supervision, it is absolutely necessary to know the laws with which grammarians conform in conjugating all verbs. In other words, the time comes when the grammar pupil should know the so-called "Principal Parts" of verbs, and their use in building conjugations. (1) Some verb, let us say "prove," should be completely conjugated on the board or on paper. The teacher should ask the pupils to mark all the tenses in which prove occurs with the figure 1, those in which *proving* occurs with the figure 2, and those in which *proved* occurs with the figure 3. The pupil should then be required to state what he has discovered, namely, in which tenses the present indicative *prove,* the present participle *proving,* and the perfect participle *proved,* occur. These words should then be called "Principal Parts," the reason for which the pupil has learned. (2) Other verbs, and among them irregular verbs, should then be treated in the same way, until by inductive comparison the pupil discovers the law of using principal parts in conjugating verbs. (3) Many verbs should now be conjugated in obedience to law, and explained by the pupils.

For complete emancipation from the teacher the pupils should be required to commit very thoroughly the principal parts of those irregular verbs which, as the teacher should know, are most likely to occur in the language work of the years in question.

COMPARISONS.—Long before all the verb-work just outlined can be completed special lessons in comparing adjectives and adverbs are appropriate. The method used in teaching the principal parts of verbs should be followed. (1) The lessons should begin with lists of "er" adjectives, followed by "more and most, less and least" adjectives, and then by "irregular" adjectives. The same course should be taken with adverbs. The endings, etc., expressing quality-degrees should be marked, and the terms degree, positive, comparative, superlative, and comparison introduced and defined. (2) The pupils should be made to see that "er and est" is the law for adjectives of one syllable, but that many adjectives of one syllable, like good, are irregular. The irregular adjectives in common use must be thoroughly committed. (3) Adjectives and adverbs occurring in reading lessons and language work should be noticed and explained.

Rules and Relation.—The rules of grammar, just like concepts and inflections, should be taught by means of illustrations. Take, for example, the rule of agreement for relative pronouns. (1) The sentence, "He who runs may read," may be written on the board. The teacher asks, Which word is the antecedent of the relative who, in the sentence on the board, Jacob? The word he. What is the gender of he, James? The Person? The number? Since who stands for the same man as he, what should be true of who, Mary? The person, number, and gender of who should be the same. (2) Yes, Mary, and this is always true of relative pronouns and their antecedents. Please state this truth as a rule, Jacob. Relative pronouns agree with their antecedents in gender, person, and number. (3) The rule thus discovered must always be used in parsing relatives.

Elementary Parsing.—(1) Beginners can not be expected to parse a word completely until they have learned all the properties belonging to the part of speech to be parsed. When, in parsing a word, the beginner can not think of all the properties that he has learned, let us say the case of a noun, the teacher must come to his rescue with a question. (2) The beginner should usually be required to give his reason for every statement he makes in parsing, as, Run is a verb, because it expresses action; it is an irregular verb, because its past tense is not formed by adding d or ed; etc. This mode of procedure is not only a valuable exercise in deductive reasoning, but it also makes it impossible for the pupil to forget any concept which he has learned by induction, and helps him to think such concepts more and more perfectly. For both reasons, this method keeps the parsing process from becoming "guess work" and "mechanical memory." (3) The time thus used is considerable, but the culture-results justify the method.

Elementary Analysis.—(1) The sentences to be analyzed by beginners should at first be free from all abstruse relations and anomalies. (2) When a sentence is to be analyzed, the pupil should state first of all what kind of a sentence it is. After that he should name the simple subject of the principal clause and state how this subject is modified. He should proceed the same way with the predicate, object, or attribute of the principal clause. Then, if there are clauses among the modifiers, these should be treated the same way. If there happen to be independent words or connecting words, the fact must be stated. This method of analyzing is called simple or synthetic analysis, and is easier because it is more mechanical than progressive or analytic analysis (see "Advanced Analysis"). (3) The teacher should always be sure that the pupil uses such terms as simple, complex, compound, declarative, imperative, clause, etc., intelligently. (4) The sentential relation of words may be interestingly exhibited to the eye by means of line-systems known as *Diagrams*. The grammatical diagram is a "skeleton picture" of a sentence. As a picture it is interesting; as a skeleton it suggests compositional relations, and is therefore quite effective as a teaching-means. Pupils may be required to offer diagrams as evidence of lesson preparations. Such an exhibit takes very little of the pupil's time, and is quite effective. For the same reason, namely, because the diagram is a time-saving skeleton, and also because its use pleases the eye, it may be used for blackboard recitations. However, as a skeleton the diagram loses its suggestive effectiveness as soon as it becomes too complicated for the memory. In that event the diagram becomes a curtain hung between the pupil's mind and the compositional relations to be thought. To make this blunder with beginners in grammar is to defeat the very purpose of teaching. Except as a time-saving device in preparing lessons for the teacher's eye, and for blackboard recitations, the complex diagram is a stumbling block even to the higher classes.

SYNTAX.—Grammatical errors in the language of the playground and the school room should not be allowed to pass unnoticed. The more the pupil knows of pronouns, tenses, moods, rules, etc., the more exact should be his conversations, recitations, compositions, etc. This is the only worthy standard of perfection for the grammar class.

Book Grammar

The special purposes of text-book courses in grammar are to perfect the work attempted in the preparatory course, to cover more ground, and to exercise the mind on harder tasks.

Definitions. —The pupil must now be required to define more completely not only what he has already learned, but also all new acquisitions. The teacher should be less and less satisfied with incomplete conceptions and with faulty statements.

Inflections. — Declensions, conjugations, and comparisons, should now be perfected in the pupil's understanding, and committed into perfect habits. New ground should be covered, and harder tasks mastered.

Rules of Relation.—The pupil must now be required to think the compositional relation of words more completely. The teacher should be less and less satisfied with faulty conceptions and faulty statements of rules. Exceptions to rules should now be noticed and explained. In the high school the pupil should begin to become acquainted with the grammar of the literary masters. The time should come, let us say in the Normal school, when grammar becomes the indispensable handmaid of literary exposition.

Advanced Parsing.—To serve its purposes effectively, advanced parsing should be systematic, rapid and significant.

SYSTEM.—The advanced pupil should be required to follow some definite order in parsing each part of speech. When, for example, a noun is parsed, the order to be followed is kind, gender, person, number, case, and rule. The order suggested by the text-book in use is usually the most convenient. With such definite parsing-order in his mind the pupil is able to think more quickly of everything that should be said of any word.

Rapidity.—The " lumbering pace " with which advanced grammar pupils are often allowed to parse a sentence is not only a criminal waste of time, but also a wretched mental exercise. To train boys and girls to be alert and quick in thinking thoughts that must be thought correctly is to fit them better for this hustling, bustling world of to-day. To this end, it is not enough to follow definite parsing tracks, as just explained, the pupil must also be allowed to parse the word completely without giving reasons for his statements. When, for example, the advanced pupil parses the verb *ran* in " He ran," he must be trained to say without serious hesitation, Ran is an irregular, intransitive verb, of the active voice, indicative mood, third person, and singular number, according to rule, etc. If, in this rapid deductive procedure the pupil makes mistakes of judgment or of statement, these must of course be corrected.

Significance.—In the high school it is quite a serious waste of time to parse completely every word of a sentence. This is true also of classes in the exposition of the English classics. In both cases the teacher should ask without loss of time just what he wants to know about a word. By this " eclectic " mode of procedure the teacher will accustom his pupils to look for important things in the study of the lesson, and the recitation will be full of energy, and not a " dead grind."

Advanced Analysis.—Advanced analysis should become more and more logical, rapid, and significant.

Logical Analysis.—The sentence to be analyzed by advanced classes should become more and more complex. After stating what kind of a sentence it is, the pupil should be required to state the whole, or " logical " subject, and the whole or logical predicate, thus resolving the thought expressed by the sentence into the two necessary mental attitudes of thought. The logical subject should then be further analyzed into its simple subject and the modifiers. The clauses modifying the simple subject should be analyzed before the logical predicate is attacked. The logical predicate should be treated just like the subject. Independent elements and connective elements should be logically explained. This logical analysis of a sentence, consisting, as it does, of analysis followed by analysis, has been called analytic or progressive analysis, and is harder because it is not mechanical or compositional but relational. For this very reason it is also best as a mental exercise for older boys and girls.

RAPIDITY.—While the pupil is learning the concepts attaching to the technical terms used in grammatical analysis, no attempt should be made to hurry him in analyzing. When, however, he has fully and firmly acquired these concepts, he should be required to reason as rapidly as he can without being confused in mind and slovenly in language.

SIGNIFICANCE.—(1) In the analysis of a master-piece, where the purpose is to help the student understand phrases, clauses, etc., as effective literary vehicles, the mind of the class must be concentrated on those word-relations which are really significant. This end must be accomplished by means of well-directed questions, thus compelling the pupil to think just what is wanted instead of wasting time by mechanically going through the whole analysis. This "eclectic analysis" serves as a stimulus to careful study, makes the mind alert in class, and is far more interesting than routine completeness. (2) The combination of "eclectic parsing" with "eclectic analysis" is termed "grammatical description, and consists of attention to the most significant properties and relations of each word or at least the important words of a sentence. In this process the selection of significant features is so choice that the process should be used only with classes of very mature minds and attainments.

Relation of Parsing to Analysis. — (1) Parsing furnishes concepts and technical terms employed in analysis. The noun, for example, paves the way for the substantive phrase, the adjective and adverbs for the corresponding adjuncts, tense for temporal clauses, relative pronoun for relative clauses, etc. (2) On the other hand, many words can not be completely parsed until the sentence has been analyzed. For example, the word which is a noun in one sentence may be an adjective in another, according to its office in the sentence. So, too, the gender, person, and number of relative pronouns can be known only by discovering the antecedent, and the case of nouns or pronouns can be known only by discovering the office of the words as parts of the sentence. (3) The parsing which prepares for analysis should, accordingly, be emphasized with beginners. To make sure that older pupils, of whom we have a right to expect as much, can say all that should be said in parsing words, they should analyze before they parse.

Advanced Syntax.—(1) So great is the number of those fine distinctions called the properties of the parts of speech and the compositional relations of words used in sentences, that the process of learning these is sure to be accompanied by much confusion of impressions. When this confusion begins to disappear, and the pupil has acquired considerable ability in declining, conjugating, comparing, parsing, and analyzing, he should receive special training in examining sentences to ascertain their grammatical correctness or the contrary, that is, to determine deductively, or according to rule, whether the syntax or construction is grammatically true or false. (2) The sentences to be examined should of course be specially prepared, the true being mixed with the false, as a stimulating test. Advanced text-books on grammar generally contain collections of such prepared sentences. Among the many things for which the pupil must look are capitals, punctuation marks, number, person, tense, mood, collocations, etc. In these advanced syntax lessons pupils should not only be required to state whether the sentence examined is correct, or in what respect it is incorrect, but also why. If these syntax lessons were pushed for all they are worth as a habit, we should have very little of that wretched English which is so commonly heard in conversation and so painfully abundant in the blackboard recitations of the compositions of the ordinary school. When the grammar teacher fails to push these lessons to their legitimate end, he fails as a practical teacher.

Preparation of Lessons.—Without thorough preparation of the lessons by the teacher and the pupil, grammar recitations are likely to be dismal failures.

The Teacher's Preparations.—Apart from the academic and professional training which makes it possible for any one to teach grammar with any prospects of success, the teacher must make daily preparations. In elementary grammar the necessity of apperceptive sequence is so pronounced that the teacher can not hope to succeed at all unless he thinks himself into "the learner's shoes" every day, and provides himself with the illustrations he will need for each daily step. In order to inspire confidence and accomplish artistic results, the teacher of advanced grammar classes must be easily the master of every situation that may arise in the course of the recitation.

The Pupil's Preparations.—(1) Even beginners should be required to record and repeat what was learned in class. (2) Book-classes should be required to decline, conjugate, compare, parse, analyze, construct, etc., according to assignment. To save time, and to exercise the pupil in symbolic thinking, systems of abbreviations may occasionally be substituted for written parsing in these lesson preparations, but such preparations should always be inspected by the teacher, to make sure that the pupil has worked "in good faith." Subject to the same cautions, the use of diagrams should be permitted in the pupil's preparation of sentence analyses.

Grammar Recitations.—The recitation is a necessary stimulus to study; it is also the teacher's necessary opportunity to exercise faculties of the pupil's mind which would otherwise remain unused, and to teach the class what would otherwise not be learned at the time.

Beginners.—(1) With beginners, as explained, the purposes of the recitation must be accomplished by means of suggestive black-board illustrations and the reading books in use. (2) The recitation itself will consist essentially of questions and answers. The questions must be organized on strictly apperceptive lines, the teacher thus causing the learners to think definitions, rules, etc., in their own words as much as possible. (3) For the deductive work which should "cap the climax" of every recitation, the class should often be sent to the board with the reading books. Simple diagrams may be useful.

Book-Classes.—(1) A part of the "book" grammar class should at once be sent to the board, some to define, others to decline, conjugate, compare, parse, analyze or construct, as the case may be. Some parsing and analyzing should always be fully written out as an exercise in language and connected thinking. Abbreviations in parsing, and diagrams in analyzing, may be substituted as a training in symbolic thinking and as interesting variations or time-savers. (2) The part of the class not sent to the board should do the same kind of work orally. The parsing and analysis, especially with the most advanced classes, may become quite "eclectic," for reasons already explained. (3) The third step in the recitation is the reading of work produced on the board. This reading should be vigorous and attractive. Corrections and instruction will be necessary supplements. The whole class should be expected to hear every reader and all instructions. Happy mood, together with a full and pleasing voice, and perfect courtesy, should be the teacher's pride and the pupil's joy. (4) The recitation should close with lesson-assignments, coupled with such remarks and suggestions as will serve the purposes in hand. The teacher should be sure that his assignments are in harmony with all the circumstances that may modify results.

Value of Grammar

Grammar is a most effective means to some of the most desirable ends in view in education.

Mental Exercise.—(1) There is no larger apperceptive subject than that of grammar in the whole range of school studies. This makes it a most valuable exercise in connected inductive and deductive reasoning. (2) So fine are the distinctions to be made in both these processes of reasoning in grammar that the will must be combined most strenuously with the judgment. (3) The reasoning process can be most admirably combined with memory in constructing definitions, declensions, conjugations, comparisons, and rules, and in using these in parsing, analyzing, and constructing sentences.

Correlations. — (1) By furnishing sentences that are mechanically correct, grammar paves the way for rhetoric, whose further purpose it must be to beautify the furnished sentences and make them otherwise effective. (2) Grammar is "the mechanic" employed by "the logician" in stating truth. (3) Thought itself—the pupil's own thought—becomes the object of attention in the logical analysis of sentences. For this reason grammar is the "ante-room" to psychology. (4) The grammar of the mother-tongue is the natural stepping-stone to the grammar of foreign languages and philology. (5) It is impossible to comprehend and fully appreciate the literary masters without a training in subtle sentence analysis. This subtle analysis should, however, never degenerate into "impertinent and trifling attention to elements employed as material or texture," to the "neglect of the structural form" which makes the master's work "a work of art." A poem that is to be loved for its own sake should therefore never be used as lesson-material in grammatical analysis.

Practical Worth.—The critical attitude of mind which a proper study of grammar develops into perfect habit is a gain to perfect English both in speaking and in writing. This training is the indispensable evidence of culture.

Teachers of Grammar.—The difficulty of grammar as a study, coupled with the professional skill which is essential to success in teaching grammar, and the manifold values of grammar, makes thorough training in grammar the indispensable prerequisite in grammar teachers.

The History of Grammar

It is only through a knowledge of the history of grammar that its great importance can be fully realized.

Genesis of Grammar.—(1) In order that the language of a people may be a perfect national vehicle of thought there must be words enough to express all ideas, enough flexibility of form in the words to express those distinctions now called the properties of the parts of speech, and the relation of words in sentences must be denoted by expressive collocations. The second of these necessities of language as a perfect vehicle of thought has given rise to word-adaptations called inflections, while the third calls for expressive sequence of words in sentence construction. Where sequence of words has made it possible, without producing ambiguity, modern Aryan languages have become somewhat less inflectional than the classic Greek and Roman, but these possibilities are obviously about exhausted in such languages as the English. Words have also been substituted for some otherwise necessary initial and terminal syllables, as in conjugations and comparisons, *but these* *substitutions must then be counted as the real equivalents.* With the exception of those phrase-differences known as idioms, the Aryan languages resemble each other very much in word-sequence. (2) Among the highly organized Aryan languages are the Hindu, the Greek, and the Roman. Hindu grammar became an exact science "in immediate connection with the study and interpretation of their sacred books, and served the main purpose of explaining and maintaining in purity of form the ancient or classical language, the Sanskrit, which had ceased to be the language of the people and was regarded as the peculiar property of the priestly class." Among the Greeks the beginnings of grammar are found in the works of the philosophers. The parts of speech, for example, were partly identified and defined by Aristotle. It was, however, not until the second century before Christ that Alexandrian scholars developed a complete system of Greek Grammar. In preparing correct texts of the Greek classics, especially of Homer, these scholars found that the manuscripts differed, and then determined the correct form by comparison with the language of Homer. The Romans left the science of grammar largely to Greek scholars.

Grammar Writers.—Zenodotus and Aristarchus were the great grammarians of Alexandria. The little hand-book of Dionysius Thrax, a pupil of Aristarchus, was "the basis of all the Greek grammars down almost to modern times," and, through its virtual use by Chrysoloras and the Renaissance scholars, it determined the traditions of school grammars for all European languages. Terence, a contemporary of Cicero, is famous for his reports concerning the materials of the older Latin and Italic dialects. An introduction to Lilly's Latin Grammar, by John Colet, published in 1510, and the exclusive standard in England for more than three centuries, was the first attempt at English grammar. In 1586, William Bullokar wrote an exclusively English grammar. "In 1758, Bishop Lowth published his celebrated grammar, an excellent work from which Lindley Murray drew most of his materials. Murray published his first grammar in 1795, and his abridgement in 1797, a work which has been extensively used in this country and in England. This popular work was largely derived from Lowth and Priestly, and owed its popularity to its practical adaptation to the school-room." The latest grammars are splendid contributions to the newer pedagogy. Among them may be mentioned West, Carpenter, Whitney, Lyte, Welsh, Reed and Kellogg, etc.

Highly Honored.—From the time of its first introduction, grammar has occupied an important place in schools. The Renaissance made grammar a stern necessity, and the long domination of humanism in education kept "the first of the seven liberal arts" first in honor down to modern times. America is not far behind in its respectful attitudes toward formal grammar. It has long been looked upon as the disciplinary study *par excellence,* not only in elementary, but also in secondary education.

Supplementary Reading.

1. Educational Review, March, 1897.
2. A Modern English Grammar. Buehler.

CHAPTER VII

ARITHMETIC

The Stuff of Arithmetic

We have seen that the stuff of any science determines the mental action. In a final analysis the subject or stuff of arithmetic is "numbers." To deal effectively with them, numbers must of course be expressed. Computations can be carried on with numbers that can be expressed. Inductive reasoning with numbers, number language, and number operations, leads to generic truths. Applied to life these generic truths give rise to exercises in the number operations and to arguments called problems.

Numbers.—The "how-many-ness" of "things" is familiarly termed "Number." A number may be known or expressed, as the whole number five, the fraction number one-thirteenth, or the denominate ten cents. A number may be unknown or unexpressed, as we indicate by saying x times five. Known numbers is the special subject of arithmetic.

The Expression of Numbers.—We may speak numbers, as when we say eleven, or write numbers, as when we use figures like 9 or letters like I and X to denote the number nine, or we may read what has been written. Thus arise counting, notation, and numeration.

Counting.—To count may mean to find how many, as in "Count your blessings." It may mean to proceed mentally, orally, or manually from a lower to a higher number always adding one at a time, as in "Count a hundred," or from a higher to a lower number, as in "Count a hundred backward." We may count by two, three, four, etc., in which case the process is equivalent to multiplying or dividing.

NOTATION.—To "notate" is to express numbers by means of "sight symbols." The necessity of expressing and dealing with large numbers both in disciplinary and practical arithmetic makes an effective system of notation very important. To be effective with large numbers and number operations the notation dare not be clumsy nor confusing. (1) The system now in vogue is the Arabic, or Decimal system. It employs only ten characters (1, 2, 3, 4, 5, 6, 7, 8, 9, 0), and is therefore a very simple alphabet. Any figure moved one place to the left is thus multiplied by ten, as in 55. The process is simple and powerful. The Roman system of notation is also a decimal system, but letters (I, II, III, IV, V, VI, VII, VIII, IX, X, etc.) are substituted for the Arabic figures. It is evidently cumbersome and confusing, and is used only for special purposes, as in chapter heads and outlines. (3) The proposed Duodecimal system would have some advantages over the Decimal system. Two characters could be added to the Arabic characters without making notation, numeration, tables, and operations even appreciably more cumbersome or confusing. Any figure moved one place to the left would then be multiplied by twelve instead of ten, thus making 55 stand for 65 instead of 55. The reduction of common fractions would also be less cumbersome, as anyone can try for himself with $\frac{1}{2}$, $\frac{1}{3}$, $\frac{1}{4}$, $\frac{1}{5}$, and $\frac{1}{6}$. The groups known as hundreds, thousands, millions, billions, etc., are employed to simplify both notation and numeration.

Numeration.—Inasmuch as numeration is merely the reading of the written number, all the perfections of the one count for the other.

Fundamental Operations.—We speak of four fundamental operations in arithmetic, and name them addition, subtraction, multiplication, and division. Percentage, proportion, progression, powers, roots, etc., are only combinations of these four operations. In the final analysis, however, all arithmetical processes are varieties in adding and subtracting.

The Generic Truths of Arithmetic.—Three kinds of general truths must be associated with the study of numbers, to make the study really effective. They are definitions, rules, and principles. (1) The process of defining, when strictly based on illustrations of the things to be defined, is a necessary exercise in clear thinking. (2) Rules make it possible to arrive at results without delay, as in decimal divisions or the roots. (3) Principles supply rules and thus emancipate from mechanical subjection. When, for example, it is understood that a fraction may be divided either by dividing the numerator or by multiplying the denominator, the rule for finding the Greatest Common Divisor is evident.

Exercises.—So great is the value of speed and skill in operations on the practical side of arithmetic, that efficiency requires habit-perfecting exercises in all necessary operations.

Problems.—Arguments in which arithmetic is used are familiarly termed Problems. These problems have the double purpose of mental training and service.

Tables.—The multiplication tables are indispensable time-savers. The tables of weights and measures are prerequisites of the fundamental operations with weights and measures. To slight these tables is to handicap arithmetic.

The Psychology of Arithmetic

It will be easy to show that nearly all the peculiarities of arithmetic are perceptive adaptations to the stuff to be attacked.

Observation.—(1) Inasmuch as number is the "how-many-ness" of "objects," it must of course be thought in the concrete through objects, as when five, or one-fourth, or a yard, is first thought. (2) Notation and numeration, running into many figures as it often does, is confusing. To avoid this effect in abstract imagination, hundreds, thousands, millions, etc., should be introduced by means of blocks or boxes named hundreds, thousands, millions, etc., all containing the same figures used in the first box. (3) To keep figures from falling "out of line," and thus causing mental confusion, in passing to the left or to the right in the fundamental operations, long perpendicular lines should be used for a while. (4) The first attack on multiplication tables should be made by explaining illustratively on the board that they are built by adding two, three, four, etc. This attack enables the pupil to build the tables, thus at the same time appealing to his reasoning and to his constructive instincts. It also shows him the reason for committing tables as labor-saving formulas. Tables of weights and measure must, of course, be taught by weighing and measuring. This may be turned into "playing store." (5) The first approach to definitions should be made through well-selected illustrations, as when we teach the denominator and numerator of fractions by folding paper into equal parts and using some of these. Rules of operation should be approached through working examples on the board and asking questions. Principles should be approached through apt illustrations.

Induction.—(1) The "always," or genus, of such numbers as five, one-fourth, or a cent, is most effectively taught through observations into which comparison to find likeness is purposely introduced, as when we use not only splints, but crayon, paper, strokes, pictures, etc. Taught in this way all number concepts soon become perfect mental habits. (2) Repetition, drill, practice,—these are the necessary things in teaching notation and numeration. Perfect mental habit must be kept in mind as the end in view. (3) All rules of operation must of course be developed into law or habit by impressive repetition, practice, drill. Tables are subject to the same requirement. (4) The apt illustrations through which principles are introduced must be reinforced by other apt illustrations making for the same end, until by skilful marshalling of cases the law or principle is reached by the learner.

Deduction.—Problem working power in arithmetic is best developed by compelling the pupil to think the conditions of the problem so clearly that he can apply arithmetical processes logically without confusion or hesitation. Apperceptive illustration reinforced by skilful questioning is often the most effective supervision.

Definition of Arithmetic.—Having become acquainted both with the stuff and the mental action of arithmetic, we conclude with the authors of arithmetic that "Arithmetic is the science of numbers and the art of computing with numbers."

Courses of Arithmetic

What number-stuff the pupil in arithmetic should learn in successive periods of time is an apperceptive problem. How much of it he should be required to get at a time depends in part upon the pupil's possibilities and in part upon the teacher's resources. How much of the stuff he ought to master depends in part upon the requirements of culture and in part upon the needs of life.

Course for Beginners.—(1) The study of numbers really begins with the child's first inquiry into the "how-many-ness" of things in the world of his senses. (2) So strong is the interest of the first five or six school years in the how-many-ness of objects, actions, and qualities that counting of all sorts commonly becomes an early passion. Appeal to the remarkable imitating powers of the child and to his vigorous competitive impulse makes it possible to teach the fundamental operations, together with the necessary notation and numeration in a few years. Through "playing store" and thus appealing to the dramatic instinct a number of weights and measures may be taught before the grammar school epoch. (2) To meet the requirements of apperception, simple subtraction should be taught in connection with addition, and simple division in connection with multiplication. Multiplication tables are the time-saving necessities in multiplication and division operations. Fraction operations should be introduced through corresponding whole number operations, and decimal lessons through corresponding common fractions. Exercises and problems should always be taught in connection with the mastering of weights and measures tables. (3) The number-life of the child as he finds it at home and elsewhere should be made the background of all work for beginners in arithmetic. (4) A text-book meeting the requirements just enumerated should be used by beginners from the fourth year upwards. It will help to bring the learner into closer range with assignments, and serve at the same time as progress toward the abstract.

Course for Grammar Schools.—By appealing to the vigorous pugnacity of the average boy in his "teens," and by reinforcing this pugnacity with explanations of the value of arithmetic as a means to ends in life, the modern teacher may cover apperceptively all the ground covered in any up-to-date grammar school text-book on arithmetic. The course should include common fractions, decimals, percentage, proportion, powers, roots, mensuration, etc.

Higher Courses in Arithmetic.—(1) The high school should cover enough ground to serve the purposes of higher education. The course should include thorough training in the "Metric System," "Commercial Arithmetic," and "Mensuration" following a year of Geometry. Several years of Algebra should precede the final stages of high school Arithmetic. The correlation of arithmetic with algebra and geometry is of the utmost importance to its apperceptive perfections.

TEACHING ARITHMETIC

The stuff of arithmetic, by determining the mental action that is best, determines also what is best in the methods of instructing pupils.

The Methods for Beginners

The best results are obtained if effective preparations have been made for school recitations.

Objects of the Recitation.—The recitation should propose at least three objects: (1) The teaching process should lead to that mental action to which the lesson to be studied should give rise; (2) the presence of classmates should be used effectively to heighten the pleasure which comes from well-doing; including that of personality, every appeal of the teacher to the mind of the pupil should act as a stimulus to study; (3) the recitation should lead to knowledge which the pupil could not or would not otherwise acquire.

Preparations by Beginners in Arithmetic.—(1) As a rule, beginners in arithmetic should not be overtaxed with preparations for their recitations. They should be taught to rely upon themselves, and when help is really needed it should usually be given by the teacher rather than by schoolmates. (2) Home-work in arithmetic should rarely be assigned before the pupil has attained the age of ten years. Too much home-work of any kind will deprive younger boys and girls of important play and sleep and home-life. Then, too, home-help may weaken and confuse the child. (3) The text-book used by beginners, say after the third year, should be simple in language and rich in effective pictures.

Preparations by the Teacher of Beginners.—(1) The modern teacher of beginners in arithmetic will always be prepared to proceed apperceptively. To this end he will keep in mind the lessons learned and avoid "gap" and "shock" in passing from the old to the new. (2) He will work harder to capture the heart of the beginner with arithmetic than to cover ground. To this end he will supply himself with convenient and interesting materials, and cultivate a happy mood.

The Recitations of Beginners in Arithmetic.—The dominating purpose of the recitations for beginners in arithmetic must ever be to make the right apperceptive approaches and to come skilfully to the rescue of the learner in mental crises, thus preventing confusion and disgust.

The following treatment of various lessons will serve as illustrations:

THE "FIVE" CONCEPT.—(1) How many roses do I hold in my hand, James? Four and one. Yes, Five, James. (2) Please count the blocks before you, Mildred. There are five. Which one of these pencils is five, Nell? It takes them all to make five. (3) Paul, you may find five cracks in the floor.

NUMBER NAMES AFTER "TEN."—Number names like fifteen, twenty-one, etc., should be introduced as ten and five, or fifteen, two tens and one, or twenty-one, etc. This is readily accomplished through splints and a long up-and-down line on the board. The lesson follows: (1) Ned, how many splints do I hold in my hand? Nine. Suiting the word to the act the teacher says, I will write nine. Putting another splint in his hand, he asks, How many are there now, Ralph? Ten. Please write ten, says the teacher. Ralph tries but fails. Without coming to his rescue the teacher asks, How many splints do I hold in my left hand, class? Ten. In my right hand, Mary? Three. Tying the ten splints into a bundle, and calling it a "ten" bundle or "one ten," the teacher draws a long down-line on the board and writes the figure 1 to the left to stand for "one ten." Where shall I place the figure 3 to stand for the splints in my right hand, Karl? To the right of the figure 1 on the board. Read the number now, Paul. Ten and three. Yes, or thirteen, "thir" coming from three and "teen" from ten. Please write ten and two, Frank. Ten and one, Anna. How many splints do I hold in my left hand, class? Ten. In my right hand? None. Write ten and none, Mary. She gets the 1 to stand for ten, but hesitates. At this crisis the teacher comes to the rescue by putting zero for "none" to the right of the figure 1. The introduction of zero at this critical moment serves as an apperceptive approach to all other number names. The pupils will write two tens, or twenty, two tens and three or twenty-three, three tens and five, etc., up to nine tens and nine almost without help.

Grube Lessons.—A German mathematician named Grube devised object number-lessons since called "Grube Lessons." Professor Seeley has adapted these lessons to American needs. To teach a "Four" Grube lesson four blocks or other convenient objects may be used. The pupil is required to place the blocks according to directions that make the lesson an addition-substraction-multiplication-division play of great value. All arrangements of the blocks are at once recorded with figures, the 4 standing first, and the other figures with the signs =, +, —, ×, and ÷ following. When all the possibilities have been developed, the record will look as follows:

$4 = 1 + 1 + 1 + 1$
$4 = 2 + 1 + 1$
$4 = 3 + 1$
$4 = 2 + 2$
$4 = 1 + 3$

$4 - 1 = 3$
$4 - 2 = 2$
$4 - 3 = 1$
$4 - 4 = 0$

$4 = 1 \times 4$
$4 = 4 \times 1$
$4 = 2 \times 2$

$4 \div 1 = 4$
$4 \div 2 = 2$
$4 \div 4 = 1$

These Grube lessons make fine busy work. They fill figures full of meaning by compelling them to stand for objective realities. Then, too, they tend to develop analytic habit in arithmetic. When the numbers grow larger the pupil must take greater and greater care to make no mistakes. This kind of number busy work may, however, be overdone, and should not be continued more than a year or two, lest it crowd out other important number busy work.

A "Carrying" Lesson.—The lessons on "number names" serve as apperceptive approaches to all operation-lessons. By using the long down-lines in addition, "carrying" is taught concretely without confusion.

$$\begin{array}{c|c|c|c|} & & 1 & \\ & & 2 & 5 \\ + & & 6 & 9 \\ & & 4 & 3 \\ \cline{2-4} & 1 & 3 & 7 \end{array}$$

(1) Children, add as I point. They say: Three, twelve, seventeen. Yes, or what, James? Ten and seven. Place the 7, Mary. What shall we do with the 1, Harry? Perhaps it should be placed above the 2, and added with the second column. Yes, Harry; and we call it "carrying" the 1. Add column two, John. Four, ten, twelve, thirteen. Place 13, Nell. She places 3 correctly, and, after just a little hesitation, finishes with 1 to the left in a new column. (2) Other problems with new crises should follow until the carrying by ten with the down-line suggestion has become a perfect habit. (3) These eye-helps should not be used longer than necessary. It would delay the pupil's mental passage from the concrete to the abstract.

A "BORROWING" LESSON.—The first "borrowing" lesson should be just as simple as it can be made, as follows:

$$\begin{array}{c|c|c|c|c|} & \multicolumn{2}{c}{1 = 10} & & \\ & 4 & 0 & 6 & 9 \\ - & 1 & 5 & 6 & 3 \\ \cline{2-5} & 2 & 5 & 0 & 6 \end{array}$$

(1) James, take 3 from 9, and write what remains. James puts 6 under 3. Now John you may work the rest of the problem while we watch. John finds trouble when he comes to 5 from 0. The teacher asks what it means to borrow money, etc. Then, suppose figure 4 was a friend of figure 0, and gave him 1, how much would it be on his side of the line,—who can tell? Figure 1 to the left is worth 10 to the right. That is true, James. Please finish the subtraction. James finishes with the figure 2, for the

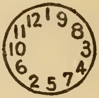
borrowed 1 made 4 to be 3 in his mind. (2) Problems containing new crises should follow until the "borrowing 1" from the left as 10 grows easy with all sorts of problems. (3) Speed-drills in adding and subtracting should follow. Grube lessons may be used as supplements.

MULTIPLICATION TABLES.—The old way of forcing children to commit tables without understanding how to build them was cruel, and cannot be condemned too severely. The late experiment of not commiting tables at all has proved to be confusion worse confounded. What the child needs first of all in mastering a table is instruction—an appeal to his understanding. After that the table must be built into habit by impressive and quickening repetitions that make confusion or hesitation simply impossible.

(1) What have I put on the board, Marie? The figure 2. How many times did I write the 2? Only once. Yes (writing it),

$$1 \times 2 = 2$$
$$2 \times 2 = 4$$
$$2 \times 3 = 6$$

How many 2's did I write above each other here, Ethel? Two 2's. What do you get by adding them? 4. How much, then, is 2×2, Irene? Writing it below the $1 \times 2 = 2$. Two times two is four. A little more questioning and building will enable the learner to complete the table by adding 2 all the time. The mental crisis is then over, and the habit-building repetitions must begin. (2) Please write the table on the board, children. Now write it backward. (This writing impresses the tables, and it can be done readily by simply adding 2 all the time, and then by subtracting 2 all the time as additional repetition). Now, Jane, say the table. You try it, Millie. (This too can be done by adding and subtracting 2 every time, and it helps to quicken table-thinking.) Even this will not suffice. He must finally be exercised in answering any "time" without a moment's hesitation or confusion. This is the real crisis. It is at this point that invention must redeem the pupil from the old-day drudgery. The necessary drill can be filled with delight by placing figures in a circle, pointing rapidly for answers, and allowing those who miss to be trapped. Much review of tables already learned is necessary. Not to review is to lose what has been learned or to confuse. (3) Tables must of course be used in problems as soon as any one is learned. This is their labor-saving, time-saving mission, as the class can be made to see by asking a boy who knows the tables and one who does not know them to add a column of 2's. The first boy will write the answer almost at once, the other boy must find the answer by much adding.



A Multiplication Lesson.—The down-lines are particularly helpful to beginners in multiplication. They promote the carrying process, and keep the worker from becoming confused in placing and adding the partial products.

(1)

			9	6	3	1
				1	5	0
×			0	0	0	0
	4	8	1	5	5	
	9	6	3	1		
1	4	4	4	6	5	0

(2)

		9	6	3	1	
×				1	5	0
	4	8	1	5	5	0
	9	6	3	1		
1	4	4	4	6	5	0

The discovery that three zeros produced by multiplying through with zero do not appear in the answer furnishes the reason for placing the zero of the multiplier one place further to the right, as in the second statement. (1) The first lesson should of course be taught by working problems on the board and asking questions or adding instruction. (2) Only practice will perfect the process into rule or habit. (3) Interesting mechanical and commercial problems involving multiplication should follow in abundance.

A "DIVISION" LESSON.—The down-lines promote the "borrowing" process in division operations, and keep confusion out of "long division." The same figures as

$$\begin{array}{r|c|c|c|c} & \multicolumn{4}{l}{1{=}10\ 2{=}20} \\ 5) & 1 & 2 & 5 & 0 \\ \hline & & 2 & 5 & 0 \end{array}$$

and

$$\begin{array}{r|c|c|l} \multicolumn{4}{l}{\quad 1{=}10} \\ 5)\ 1 & 2 & 5 & 0\ (250 \\ 1 & 0 & & \\ \hline & 2 & 5 & \\ & 2 & 5 & \\ \hline & & & 0 \end{array}$$

should be used to introduce "long division" as only another way of getting results when the divisor is larger than 12. The first lessons should of course be taught by working problems, asking questions, and adding instruction.

SPECIAL SPEED DRILLS.—The charge is often made—and there are facts in the case—that public schools fail to produce speed enough in the art of computing with numbers. What we need is speed drills to remedy the defect. (1) Rapid adding is the first necessity. Have children add by twos, threes, etc. Later on have them compete with each other in adding long columns of figures. (2) Naming the sum and difference of two numbers is a very effective exercise. In this exercise the teacher speaks two numbers like seven and nine, and the pupil says sixteen, two. Trapping improves this exercise. (3) The four operations can be combined as a speed drill, with trapping as a stimulus. In this drill the signs +, —, ×, and ÷ are written across the board, and underneath them in columns figures 1, 2, 3, 4, etc., up to 9, or the figure that has been mastered in multiplication tables. The teacher points to any figure, avoiding remainders in the dividing tasks, and the pupils do what the sign at the head of the column requires.

High Notation and Numeration.—When the class has become proficient in writing and reading any number expressed by means of three figures, as 475, the notation groups known as thousands, millions, etc., can be taught very quickly and effectively by means of blackboard box-pictures in each of which the same figures should be used. See the following illustration: (1) Read what I wrote, Frank. Four hundred seventy-five. I will write a box for the number

475

Please read what I wrote in the second box,

475	

Mary. Four hundred seventy-five. In the third box,

475		

James. Children, let us call the second box "Thousands," and the third box "Millions," just to keep from mixing them. I will fill the boxes (doing so while he speaks), and Jane may read

475	475	475

Jane reads correctly. Substituting zero for the 5 in all the boxes, the teacher asks some child to read. After that, zero can be substituted for the 7 in each box. And finally commas must be substituted for the boxes. When completed the box pictures will appear as follows:

475	475	475
470	470	470
400	400	400

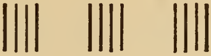
400 , 400 , 400

(2) The box-pictures appeal to the child's imagination, and help to keep the many figures from getting mixed in the mind of the child. The same figures are used in all the boxes, for then the box-name is the only new thing to be learned, and this makes the apperception easy. The substitution of zeros is a necessary apperceptive lesson in the use of zeros. The abstract comma is finally substituted for the concrete box because the only reason for the box was to pave the way for the abstract, and because the commas take less time. (3) Drills must be added.

Terms of a Fraction.—(1) Children, watch me fold this paper. What am I trying to do, Jacob? You are trying to fold it into equal parts. Into how many equal parts have I folded it, Edith? Into four. What may we call one of four equal parts of the folded paper, Mary? Perhaps we may call it a fourth part. Yes, one-fourth. Now let us write one-fourth with figures. Who will try? If no one succeeds, the teacher writes $\frac{1}{4}$, calling it a Fraction, and explaining the name in the simplest way. When the children have all had their turn in trying to tell what a fraction is, the teacher asks, Which figures show into how many equal parts the paper was folded, Emily? The figure 4. The teacher then introduces the term Denominator by writing the word on the board and asking two or three pupils to tell what the denominator is. The Numerator is to be taught in the same way. (2) A variety of numerators and new denominators is then introduced through illustration and questions until the conception is complete. (3) Drill in writing fractions must be added.

The reason for teaching $\frac{1}{4}$ before $\frac{1}{2}$ and $\frac{1}{3}$ is that "four" suggests "fourth" more directly than "two" and "three" suggest "half" and "third." In other words, there is less confusion in the apperception.

Two-thirds of Twelve.—(1) Please count the strokes



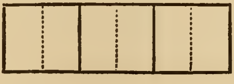
I have put on the board, Jacob. There are twelve. Into how many equal groups did I group the strokes, Marie? Into three. What may we call one of the three equal groups? A third. Two groups? Two-thirds. How many, then, are two-thirds of twelve, John? Two-thirds of twelve are eight.

I will show you how to get the same result by means of figures. Writing $\frac{2}{3}$ of 12, the teacher rubs out the word "of" and substitutes ×, thus

$$\frac{2}{3} \times \frac{12}{1} = \frac{24}{3} = \frac{8}{1} = 8.$$

The apperception is very simple. (2) Lessons on $\frac{2}{3}$ of 15, $\frac{7}{8}$ of 16, etc., should follow until the process becomes a habit or law. (3) The class should be required to picture and work many similar questions until speed has been acquired and confusion conquered.

Two-thirds = Four-sixths.—(1) Into how many equal parts have I divided the box-picture,



Maude? Into three. What shall we call each equal part, Grace? A third. Two parts? Two-thirds. Into how many parts have I now divided the box, Karl? Into six.

What shall we call one of the equal parts? A sixth. Please count the sixths in two-thirds of the box, Helen. There are four-sixths in two-thirds of the box.

Let me show you how to get the same results very quickly by means of figures. Writing

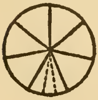
$$\frac{2}{3} \times 2 = \frac{4}{6},$$

the teacher calls attention to the fact that each third of the box is two-sixths of the box, thus giving the child the apperceptive reason for using 2 as the multiplier of both terms of $\frac{2}{3}$. This, of course, is the crisis of the lesson. (2) The process must be perfected into law or habit by the use of other illustrations. (3) The whole class should be required to draw boxes showing that

$$\frac{2}{3} = \frac{6}{9}, \frac{3}{5} = \frac{12}{20},$$

and to get the true results with figures.

TWO-THIRDS OF FIVE-SEVENTHS.—(1) Boys, into how many equal parts have I tried to divide this circle? Into seven. And what shall we call five of these equal parts, Jemmie? Five-sevenths. And what have I done now, girls? You have divided one-seventh of the circle into three equal parts. Shall we call each new part one-third of the circle, John? No; each new part is a third of a seventh of the circle. What have I done this time, Maude? You have divided each seventh into three parts. Count all the parts, Marie. There are twenty-one. Then what may we call one third of one seventh? One twenty-first. Mark two thirds of one seventh. Two thirds of five sevenths.



Now count, Marie. There are ten twenty-firsts. What then is true, James? Two thirds of five sevenths is ten twenty-firsts.

The same result can be gotten very quickly by means of figures, children. Let me show you. Writing $\frac{2}{3}$ of $\frac{5}{7}$, the teacher then erases "of" and substitutes × thus, $\frac{2}{3} \times \frac{5}{7} = \frac{10}{21}$. The novelty and quickness of the process pleases, and thus impresses and tempts. (2) The process is easily developed into rule or habit by means of additional examples. (3) Plenty of busy-work should follow.

Six Divided by One Third.—(1) Please divide 6 by 3, Miriam. Miriam writes $\begin{array}{l} 3\underline{)\quad 6\quad} \\ \qquad 2 \end{array}$. Now divide 6 by $\frac{1}{3}$. Miriam writes $\frac{1}{3}\underline{)\quad 6\quad}$, and grows confused. This is the mental crisis. The teacher coming to the rescue asks, Should the answer be more than 2 if we divide by $\frac{1}{3}$ instead of 3,—who can tell? It should be more. I will show you how to divide with a fraction. You must turn it upside down and proceed as in multiplying, thus $6 \div \frac{1}{3} = \frac{6}{1} \times \frac{3}{1} = 18$. (2) Please step to the board, children, and work the problems I shall dictate. (3) I will now write a number of problems. Please copy them, and work them out at your seats. Bring the solutions with you to-morrow.

(1) Presently, when the boys and girls begin to wonder "why" divisors should be turned upside down, or "inverted," the teacher comes to the rescue as follows:

$$\begin{aligned} 1 \div 1 &= 1 \\ 1 \div \tfrac{3}{3} &= 1 \\ 1 \div \tfrac{1}{3} &\text{ must be } 3 \\ 1 \times \tfrac{3}{1} &= 3 \end{aligned}$$

1 divided by 1 equals what? 1. If I write $1 \div \frac{3}{3}$, what will the answer be? 1, because $\frac{3}{3}$ is 1. If I write $\frac{1}{3}$ instead of $\frac{3}{3}$, what should the answer be? 3, because the new divisor is three times as small as before. What then

is our reason for always inverting a fraction divisor and proceeding as in multiplying? I think we do all this because it is the only way to get what we know we must have for the answer. (2) After this the class can be led to see apperceptively that what is true of dividing 1 by $\frac{1}{3}$ must be true of 6 divided by $\frac{2}{3}$, etc.

NOTATION OF DECIMAL FRACTIONS.—(1) Please read the fraction I have written, Maude. One tenth ($\frac{1}{10}$). Let me show you another way, called the "Decimal" way of writing $\frac{1}{10}$, thus .1, the dot standing for the denominator 10. Who can write $\frac{1}{100}$ as a decimal? Several attempts are made, but nearly all of the pupils write .10. This is evidently a mental crisis, and the teacher writes .01, placing the 0 before the 1. Please write $\frac{1}{1000}$, Jane. That is correct (.001). Charles will write $\frac{125}{1000}$. .125. The apperception is comparatively simple, and the learner knows his way into the mystery of decimals. (2) Speed drills in which competition is produced by assigning the same tasks to the whole class, should follow.

DECIMAL OPERATIONS.—(1) Problems in addition, subtraction, multiplication, and division must be worked by the teacher. This illustrative work must be accompanied by explanations. (2) The processes observed must be developed into rule or habit by practice, or repetition. (3) The class must be quickened by means of competitive speed drills on the board, and the operations learned must be woven into problems touching life outside of school.

PLAYING STORE WITH WEIGHTS AND MEASURES.—(1) "Dry Measure," "Long Measure," "Avoirdupois Weights," "Money Values," and other weights and measures can be "played" to great advantage. The realism of the thing, appealing as it does to motor instincts coupled with social life, etc., is fascinating to the boys and girls up to the early "teens." The necessary materials and equipments are easily procured. The weights and measures thus learned must of course be gathered up into tables. Tables thus gathered up will be understood and valued at their real worth. (2) To make them "second nature," so that they may serve as rules in working problems, many repetitions will be necessary. Every table should be written frequently, thus impressing it. And it should be spoken, thus quickening the memory. All confusions must be conquered by resourceful drills. Much review will finally make any table a permanent possession. (3) Every table learned should be used in solving problems. The teacher should write the problem, let us say,

$$2\underline{)\ \text{£}3\quad \overset{20}{5\,\text{s}}\quad \overset{12}{7\,\text{d}}\quad \overset{4}{1\,\text{f}}}\,,$$

and work it, adding such instruction as is necessary. Abundant practice should follow.

The realism of playing store with weights and measures that can be brought into the school-room may of course be pushed into larger weights and measures, as acres and tons, or into abstract concepts, as an hour. Some boy, for example, may be required to take about 70 yard-steps in a straight line across a field, and then just as far at right angles to the first line. The whole school may be watching. When the boy has returned, the teacher should draw the two routes taken by the boy and complete the square, calling it the picture of an "acre." The realism with which it was associated will prevent all confusion in the acre concept.

A 3.1416 Lesson.—(1) James, please measure the diameter of this circular wheel. It is exactly one inch, Miss Johnson. Now measure the circumference with this tape. It is 3 inches and more. Yes, James, it is .1416 of an inch more. You will have to take my word for the decimal part until you study Geometry. (2) Now, Mary, please measure this larger circle. And this smaller one. I find that the circumference is about 3 times—perhaps I should say 3.1416 times as long as the diameter, Miss Johnson. How then may we always find the circumference of a circle, Ralph, if the diameter is given? And how may we find the diameter if the circumference is given, Paul? (3) The class may step to the board. Please find the circumference of a circle whose diameter is 15. Now find the diameter of a circle whose circumference is 15.7080 inches. Prove it by constructing the necessary circle.

GIVING TASKS TO BEGINNERS AT THE BOARD.—The same tasks should be assigned to all the members of the class. This will put them into friendly competition with each other, thus producing speed in working. This must be the dominating purpose in the exercises for beginners. It is the habit building epoch in arithmetic.

BOARD WORK PERFECTIONS.—All the figures should be legible and neat. All the signs of operation and the like should be formed correctly. Quiet courtesy should become the habit. The strictest honesty must be the rule and ideal.

BEGINNERS EXPLAINING BOARD WORK.—The pupil should hold the pointer in the right hand, or the left, as may suit the place from which he must face the class. The pointer should be capped with an old fashioned lead pencil rubber cap. The pupil should stand easily erect, unconscious of the hand not in use. He should speak with a pleasing voice, distinct and loud enough. As a rule the explanation of beginners is only telling what was done, with the simple why's that may be possible for such beginners.

ASSIGNING THE NEXT LESSON.—(1) No lessons should be assigned to young pupils. All that they should be required to do between times must consist of repetition work. (2) When the class grows older, book-lessons may be assigned. This should be done at the close of the recitation, and coupled with such suggestions, hints, etc., as the class may need.

Methods of Teaching Intermediate Arithmetic

The apperceptive process must be deepened more and more as the pupil in arithmetic continues in his course. The useful and the strenuous must be emphasized more and more in his tasks.

Preparations for Recitations.—Preparations for the reci-recitations must be emphasized more and more as the pupils pass on through school.

Pupils Preparing Lessons.—(1) The preparation of lessons by means of text-books puts to profitable use "between times" that are often foolishly wasted. (2) Wisely safe-guarded against the evils of extending the study-hours too far into the night, home-study is of the greatest importance to boys and girls growing up and getting ready for the life they must live when school days end. (3) To develop the very important power of self-reliance, the text-books in use should not contain answers; for if they do, the pupil will be tempted to rely on "authority" and thus fail to become a real "thinker."

The Teacher's Preparations.—(1) The modern teacher of arithmetic will not "trust his memory" from year to year in arithmetic. Even if his text-book should contain the answers, he will study the lessons every year. This will make sure of himself in every crisis. In his apperceptive rescues of the learner in confusion there will be the skill and effectiveness of the master. (2) In order to assign new lessons apperceptively he will keep at least a day ahead of his class. (3) To save time for his classes he will write out questions for the board work. (4) School books should not be too large and heavy. As a result texts on arithmetic seldom contain enough exercise under each rule to produce speed enough and skill enough in the process. Then, too, the book can not meet the special needs of the individual pupils in the development of power to wrestle with arithmetical complexities. For both reasons the teacher must construct supplementary problems specially adapted to the purposes in hand. These must of course be written on the board for the classes, and, when worked, must be inspected. All this takes time, but it pays in the end.

The Recitations of Intermediate Pupils.—Several adjustments to the needs of boys and girls who have lately passed beyond the elements, or fundamentals, of arithmetic, deserve attention. Among these are the following:

Assigning Problems.—(1) When the class has passed to the board and prepared it according to directions, a different problem should be assigned to each pupil. This method serves the special purposes of intermediate arithmetic: it compels the worker to wrestle independently with difficulties; and it helps the teacher cover in a reasonable time the ground that should be covered in preparing pupils for life. (2) As a rule the problems to be worked should be written on "numbered slips" of paper, and distributed to pupils at the board. This takes time, but pays in the end. When the books in use do not contain answers, and the class is large, the pupils may be sent to the board by "page and number." But the book is in the pupil's way. If the class is mature and small, problems may be "dictated," the pupil being allowed to take down "in short" just enough to serve the purpose. The teacher should speak distinctly and the pupil should attend carefully.

Board-Work Perfections.—The teacher should never tolerate the "slip-shod" carelessness of which boys and girls in their early "teens" are so often guilty. Every figure, line, or mark should be quite correct and distinct. Every statement should be definite and complete. Every step in the working of the problem should be taken advisedly. Absolute system should be cultivated.

Explaining the Board-Work.—(1) Pupils should hear each other explain problems. The practice has high cultural value. The latter part of the recitation period should be wholly set apart for explanations. The intermediate pupil's explanations should of course be argumentative rather than descriptive. (2) When the class fails on something that was to be conquered at the board, all that may be needed is a skilful apperceptive explanation by the teacher. To defer such explanation too many days may arouse the suspicion that the teacher cannot work the problem, or if not that, it may cause the class to lose ambition. Explanation should usually be coupled with the introduction of new subjects or new cases. The proper time for such explanation on the part of teachers is when lessons are assigned.

TEACHING GENERAL TRUTHS.—As already said, the general truths of arithmetic deserve attention. The explanation of problems should extend to definitions, rules, and principles. (1) The intermediate pupil should be required to prove his definitions. (2) When new subjects like percentage, proportion, progression, or roots, are taken up, possible rules of operations should be compared. The method that has the strongest arguments in its favor should then be agreed upon, and developed into life-habit. (3) Older pupils should be taught to deduce rules from principles, and to extend the simpler rules to complex applications. From the principle "the smaller the divisor the greater the quotient," the rule of inverting fractional divisors and proceeding as in multiplication can be readily deduced. The familiar rule of dividing a fraction either by dividing the numerator or by multiplying the denominator, applied to a number of fractions like $\frac{2}{4}$, $\frac{4}{6}$, $\frac{6}{8}$, and $\frac{8}{10}$ gives rise to the rule of finding the "greatest common divisor of these fractions. The argument is really very simple: The number 2 is a divisor of all the numerators, and it is also the greatest divisor at the same time. In other words it is the "greatest *common* divisor" of the numerators. The greatest common divisor of the denominators must just as evidently be the least common multiple of these denominators. This multiple is readily found by multiplying the prime factors together. The problem is therefore worked as follows:

$$\begin{array}{l} 2\,)\underline{\ \tfrac{2}{4}\quad \tfrac{4}{6}\quad \tfrac{6}{8}\quad \tfrac{8}{10}\ } \qquad 2\text{ G. C. D.}\\ \times \\ \quad 2\,)\underline{\ 2\quad 3\quad 4\quad 5\ }\\ \qquad\times 1\times 3\times 2\times 5 = 120\text{ L. C. M.} = \text{G. C. D.}\end{array}$$

When the intermediate pupil finally passes into high school work, the argumentative phases of arithmetic must of course be emphasized increasingly, and the practical applications of arithmetic must be extended into all the most important concerns of life.

Teaching Advanced Arithmetic

Advanced arithmetic, consisting of complex arguments, and therefore resorting to complex computations, should evidently be attempted only by pupils who have mastered the "apperceptive whole" which makes it possible for them to succeed. The pupils should be isolated more and more from the teacher in their lesson-preparations. Less and less direct instruction, but more and more effectual appeal to manly pugnacity, becomes the teacher's necessary rule of dealing with the class. The teacher who knows his subject and his pupils well enough to adjust the two apperceptively and genetically all through the intermediate course, should find no serious obstacles in advanced work.

Mental Arithmetic

Mental arithmetic is so called from the attempt of Warren Coburn to devise a strictly cultural arithmetic—arithmetic "for the mind's sake" rather than "for filthy lucre's sake."

The Nature of Mental Arithmetic.—The special purpose determines both the construction of problems and the method of solution. (1) The problem is so framed that the solution must consist of alternate analysis and synthesis in logical succession. (2) All mental jumps and language make-shifts in the solving of problems is strictly forbidden. (3) Fidelity to Coburn's ideal combines memory and will most effectively with analytic and synthetic reasoning. (4) The effort to say exactly what one thinks exactly is a most valuable exercise in language.

The following problem and solution illustrate the nature of mental arithmetic:

Problem.—If $2\frac{1}{2}$ ℔s. of coffee cost 50 cts., what will $3\frac{1}{3}$ ℔s. cost?

Solution.—If $2\frac{1}{2}$, or $\frac{5}{2}$ ℔s. of coffee cost 50 cts., $\frac{1}{2}$ ℔. costs $\frac{1}{5}$ of 50 cts., or 10 cts., and $\frac{2}{2}$, or 1 ℔., costs 2 times 10 cts., or 20 cts. If 1 ℔. costs 20 cts., $\frac{1}{3}$ ℔. costs $\frac{1}{3}$ of 20 cts., or $\frac{20}{3}$ cts., and $3\frac{1}{3}$, or $\frac{10}{3}$ ℔s. will cost 10 times $\frac{20}{3}$ cts., or $\frac{200}{3}$ cts., or $66\frac{2}{3}$ cts.

Course of Lessons.—Mental arithmetic should be taken up in earnest in the latter years of the intermediate course in written arithmetic. The course can hardly be completed before the second or third year of the high school. An elementary course in Algebra helps mental arithmetic very much. This course should belong to the last year of the grammar school.

Assigning Lessons.—The analytic character of mental arithmetic and its independent progress from problem to problem, makes it necessary to assign shorter lessons than in written arithmetic.

Preparing Lessons.—(1) The teacher must be absolutely sure that he can solve all questions and prove the answers. Neglect along these lines is serious; it confuses the class and destroys necessary confidence in the teacher as a teacher. Boys and girls in their "teens" admire the "master" in mental arithmetic. (2) The pupil should be accustomed to solve all questions of the assigned lesson before the recitation period arrives. This helps to concentrate the mind on the subject; it furnishes a most effective exercise in independent thinking, and makes it possible to accomplish better results in the recitation period.

Recitation Methods. — If the culture results of which mental arithmetic is capable are to be fully attained, the problems must be solved without referring to the book. Several methods may be followed.

Common Method.—The teacher reads a problem, and calls upon a pupil to rise, repeat the problem, and solve it, without referring to the book. This method compels the whole class to listen until the question has been assigned, and it combines a high degree of attention with memory and reasoning. This, as we recall, is the end in view. Trapping may be permitted as a stimulus to attention and study.

Chance Method.—The common method may be modified in one very important respect. Cards with the number and page of the problems to be recited may be prepared. The recitation may begin with the drawing of a card by each pupil. When the teacher has read a problem, he mentions the number and page, and the pupil holding this number rises, repeats the problem, and solves it as he would in the common method. The "chance method," as it has been aptly called, has the merit of preventing all charges of partiality, and at the same time serves as a stimulus to study.

Parts Method.—The "parts method" is so called because the pupil first called upon to solve a question is not allowed to finish. The person called upon to take up the solution where the first one left off, may be followed by another, and this one by a third, and so on. This method requires intense attention on the part of the teacher and the class. The strain is however too great. Only superior personality can hope to succeed with this method.

Silent Method.—When the teacher has read a problem, all pupils solve it silently. As soon as any pupil gets through he raises his hand. Presently some one is requested to rise, repeat the problem, and solve it. This method undoubtedly serves the purposes of mental arithmetic admirably, but requires too much time. It may be used occasionally as a stimulating variation from the common method.

Written Work.—Part of the class may be sent to the board to write out solutions while the rest of the class solve questions orally. Pupils sent to the board must of course be allowed to take the book, unless the problems have been copied from the book on cards. The specific purposes of mental arithmetic are thus largely lost, but the writing out of problems is nevertheless a fine exercise in reasoning and language. Where the class is large, the method helps to employ more pupils profitably.

Value of Arithmetic

The value of arithmetic as a means to ends in education has always been recognized.

Culture.—As soon as the pupil has fairly mastered the mechanics of arithmetic and entered its argumentative fields, arithmetic becomes a disciplinary study preëminent. (1) The memory must hold in immediate readiness the apperceptive whole without which no new conquests can be made. (2) The employment of the mechanics of arithmetic as a means to ends in the argument calls for nicety of judgment at every turn. (3) As an argument consisting of equations arithmetic is an admirable exercise in exact reasoning. (4) As an effect of the exactness of its reasoning process arithmetic develops respect for absolute truth. (5) The stress and strain under which the complex argument of arithmetic puts the pupil enlarges will, makes it wrestle harder, leads to perseverance, and the like. (6) Inasmuch, however, as arithmetic confines the mind to quantity divorced from quality, it tends to narrow vision when pursued without correction. And the respect for absolute truth which quantitative argument tends to beget may easily develop into a very objectionable dogmatic attitude of mind.

Practical Value.—The celebrated "Committee of Fifteen" has this to say about the practical value of arithmetic: "It is the first tool of thought man invents in the work of emancipating himself from the thraldom of external forces. For by the command of numbers he learns to divide and conquer. He can proportion one force to another, and concentrate against an obstacle precisely what is needed to overcome it. Number also makes possible all the other sciences of nature which depend on exact measurement and exact record of phenomena as to the following items: order of succession, date, duration, locality, environment, extent of sphere of influence, number of manifestations, number of cases of intermittence. All these can be defined accurately only by means of number."

Training of Teachers.—If arithmetic is so important teachers must be adequately trained. (1) This training includes first of all a thorough mastery of the subject itself. This course should include not simply the lessons which teachers must teach, but a much more extensive course to serve as inspiration and to furnish all the points of view in teaching the subject. (2) The arithmetic teacher should be able to organize arithmetic apperceptively. Unless he can do this, he will never make disciples. To accomplish these ends the arithmetic teacher needs a thorough course in the psychology of arithmetic. (3) Then, too, the arithmetic teacher must know genetic psychology as such. Without a general course in genetic psychology it is difficult to know the individual pupils of the class. The apperceptive adjustment of tasks to the pupil "where he is" genetically interpreted is the very highest pedagogic attainment.

History of Arithmetic

Arithmetic is one of the oldest children of necessity. It was used before the world began to be civilized. It was the indispensable handmaid of astronomy and building operations in the valley of the Nile and the valley of the Tigris and Euphrates four or five thousand years before Christ. The speculative Hindoos were the fathers of the decimal system and the Arabs revealed the secret to the Western world. To the Greeks and Romans belongs the honor of converting arithmetic from an occult art cultivated by the few into a liberal art given to the schools. Arithmetic was the fundamental art of the quadrivium of the Middle Ages. In modern needs it has become one of the three R's, the most indispensable means to the ends of practical education. More than this, it has become the highly developed and all-powerful handmaid of science and philosophy.

Supplementary Reading.

1. Educational Review, April, 1897.
2. Educational Review, November, 1891.
3. Educational Review, April, 1906.
4. American Education, September, 1906.

CHAPTER VIII

GEOGRAPHY

The Nature of Geography

GEOGRAPHY is now a science. As a science it makes the subjects of many other sciences its own, and yet remains distinct from them. Briefly put, Geography is the science of the earth and man as related to each other.

The Subject of Geography.—The real subject of geography is not the earth as such, nor man as such, but the earth as the physical environment of man, and man as he accommodates himself to this environment.

SUBDIVISIONS OF GEOGRAPHY.—(1) The study of the earth as the physical environment of man is known as Physical Geography, or Physiography. In physiography the earth as environment is subdivided into land and water, soil and weather, and the natural resources which result from these. Astronomical, or Mathematical Geography, is that subdivision of physiography in which the earth is studied as a part of the solar system.

(2) Man is the subject of geography in all his attempts to adapt himself to the earth as his home or the earth as his home to himself. These attempts produce political divisions of the surface of the earth, special forms of government, society, etc., a multitude of industries, arts, and occupations, etc. The study of these attempts and their results is known as Historical, or Political Geography. Commercial geography is that department of political geography devoted especially to the useful commodities, the productive centres of the earth, and the markets of the world.

RELATION OF GEOGRAPHY TO SCIENCES.—Geography, as has been said, invades the domains of many sciences—is in a sense a conglomerate. In the study of plants, for example, geography invades botany, but differs from botany in this that it does not study plants as plants, but as part of the physical environment to which man must adapt himself as man. In the same way geography invades physics, chemistry, geology, mineralogy, zoology, meteorology, astronomy, etc., on the side of nature, and history, psychology, sociology, civics, etc., on the side of man. Because geography invades all these sciences to study things of vital importance to man, it is a most interesting cyclopædic preparation for so many sciences. And because the subjects which must be studied as man's physical environment cannot be fully understood as environment until they become subjects in and for themselves, all the sciences which geography invades must be used as final reinforcements of geography.

The Psychology of Geography

The mental action to which the science of geography gives rise is somewhat *sui generis,* like other sciences, as a consequence of the nature of the subject matter.

Observation.—(1) The "near" must be directly observed, as when we study islands, bays, soils, winds, people, industries, etc. As in other studies, so in geography, accurate perception is the only safeguard against erroneous conception and apperception. And the language of geography must get its real meanings from the things themselves. (2) The "far" must of course be pictured by the help of the sense-experienced "near," as in studying other lands and people. The process may be called apperception, but it is a complex process, and involves especially imagination well supported by the memory and judgment. Geographical imagination can be greatly reinforced by imitating, or representing, whatever is to be mentally pictured. The most concrete means of such imitation are sand, clay, and photographs; the most convenient means are relief globes, ordinary globes, relief maps, ordinary maps, and descriptive texts. Such imitation, or representation, not only reinforces geographical imagination, but it reinforces also its necessary handmaid, memory.

INDUCTION.—By reason of the size, extent, or distance of the things to be studied, the comparison of cases to develop concepts and definitions, and the comparison of causes or effects, in order to discover laws and systems, are often quite beyond the capacity and interest of beginners, and should therefore be simplified if possible, or deferred to later times, as in the study of drainage, winds, tides, currents, forms of government, society, etc. The teacher should always proceed from the simple to the complex subject, and from the less to the more remote in causal sequence. And both the matter and the attack upon it should be nicely adapted to the dominant interests of the class at the time in question. The "large" should, if possible, be introduced through the "small," as when we teach continental drainage through its home-geography "type," or case. Complex "development lessons" like the commercial area bordering upon the great lakes between the United States and Canada should be deferred to the high school period.

DEDUCTION.—Geography misses its supreme mission when it fails in its practical applications. The teacher of geography should constantly endeavor to "drive home" the laws to which the life of man must be subjected as a consequence of his environment. The final purpose of geography must ever be to use the mountain and the river, to adapt one's self to wind and wave, to times and seasons, etc. The difficulty of the struggle should be honestly set forth, the need of world-wide sympathies should be ever emphasized, and the boundless opportunities of life should be seized upon with enthusiasm.

Courses of Geography

In harmony with dominating interests and the main requirement of apperceptive sequence, as shown by specialists, geography can be taken up most conveniently in three courses.

Course for Beginners.—Up to the age of ten or twelve, the child is very much interested in moving objects, in observing concrete things, in the recognition and naming of things, in human life and animal life, especially in home life and child life. Between the age of eight and twelve, roughly speaking, these "child loves" widen into many channels. The collecting instinct begins to manifest itself, and often with much force. All sorts of particulars are readily stored in the memory. The homes of people, their clothing, food, habits, occupations, etc., become intensely interesting to the child of ten. Interest in animal life continues to be strong. Land, water, weather, flowers, stones, stars, etc., attract much attention, and provoke many questions. Hero worship coupled with desire to be brave and free manifests itself quite early in both sexes. The patriotic interest coupled with more or less political interest wakes up almost as early. The longing to know the cause of phenomena begins to manifest itself, but not with any special force. If these interests are the measure of the child, the course for beginners in geography should be something like the following: (1) The course should begin with man and nature in the child's immediate surroundings. The emphasis must be on life, especially human life and animal life. The world of plants, stones, stars, etc., should be entered at the interesting gateways. The course should include the study of the simplest phases of the political life in the home land. Causal questions should be recognized and respected. (2) The course in "home geography" should be extended to a course along the same lines in other lands. (3) "Globe geography," or "the earth as a whole," should be introduced in its simplest form in connection with lessons on other lands. The meaning of maps must be taught very early. To this instruction must be added simple exercises in free-hand map-drawing as a necessary reinforcement of the geographical imagination. Elementary lessons on wall maps are important for the same reason. (4) The preceding course, and a preparatory training in form and numbers, should be followed by a simple course of lessons in mathematical geography. This course should include simple explanations of day and night, and the seasons. Lessons on parallels, meridians, zones, etc., must follow.

Intermediate Course.—Extension and details, secured through home excursions and imaginary travels, become a most attractive pursuit of the boys and girls at the threshold of the early "teens." Likeness and relation, together with larger wholes, now attract some attention. The abstract and the general begin to please. Accordingly, the second course in geography should conform at the same time to the law of apperceptive sequence and these dominating interests. (1) The area of the earlier home geography should be very much enlarged and perfected. "The human element should still predominate with greater and greater stress on details including art, occupations, manufactures, economical, social, and political conditions, with considerable weight on comparisons." (2) The area of the early travel course, like that of the early home geography, must be very much extended and perfected. (3) Elementary physical, mathematical, and commercial geography should be woven into the home geography and the travel course. (4) Map study and free-hand map-drawing must of course accompany and constitute an important part of the intermediate course. (5) The content of the intermediate course should always have an important bearing on ordinary life.

Advanced Course.—Likeness and relation, together with larger wholes, become dominating interests of older boys and girls. This is the scientific interest. Mathematical and commercial interests are usually also very powerful. The high school course in geography should therefore include thorough courses not only in political, but also in mathematical, physical, and commercial geography. Comprehensive college courses, and highly special courses must wait.

TEACHING GEOGRAPHY

The matter of geography, by determining the mental action that is best, determines, as always, also what is best in methods of instruction.

The Method with Beginners

The teaching of beginners in geography, like that of any branch, has its own peculiarities as determined by the special purposes.

Preparations.—(1) The child learns a great deal of geography before he takes it up as a study. When geography becomes a study, as it should at the age of eight or nine, a formal text-book is really a hindrance at first. Until a text-book is given to the learner, no special preparations can be made by him, except that part of the busy-work between recitations may be based on geography that has been learned. When a formal text, like that of Morton is taken up, as it should be at the age of nine or ten, lessons must of course be assigned by the teacher and prepared by the pupil. Nature study collecting, mounting, and labelling should be encouraged as the class grows older. Inter-school geographical correspondence and exchange of photographs are recommended. (2) The teacher of beginners in geography must take the time to choose the subjects to be studied day after day. This daily choice of subject matter must conform with the general requirements of apperception and the dominating interests of childhood. He must master the subjects chosen, and plan the very details of the coming recitation, leaving just as little to chance as possible. If the recitation is to be "out-of-doors," as it must be very frequently in "home-geography," he must have the situation well in hand, so that waste of time and confusion may not mar his efforts. He must also supply himself with the photographs, globes, maps, and travel books which he will need for the geographical imagination, or the extension from the near to the far, the small to the large, etc., which belongs to almost every lesson. The sand, clay, moulding board, paper, pencil, board, etc., needed for the drawing exercises must be at the teacher's command.

Recitations with Beginners.—(1) The study of geography, as said elsewhere, should begin with home surroundings. What is learned in this way should be used as the stepping stone to something like it in the distance. The creek in the meadow near the school, for example, should be used to help the beginner study a river that is seen only in pictures or in drawings. The things observed and the thing to be pictured must not tax the powers of the learner too much. (2) Inductive apperceptions should be simplified by selecting cases that are very much alike, and relations that are very obvious, for comparison. For instance, to think the definition of a bay the child should see a number of bays so much alike as to make the bay idea necessary. To help the beginner think the law of water courses he should see relief areas whose slope and course of stream are so evidently cause and effect that he will surely see the connection. (3) The deductive, or practical, apperceptions so important in geography should of course be simplified just as much as the inductions. The new cases should be so much like the old that the class to which they belong is evident. (4) The recitations should at first be wholly oral. A little board work may be introduced by and by. (5) The following lessons are appended as illustrations of the method to be used with beginners. It will be noticed that the learner is always required to observe the near, and pass from it to the far by apperceptive imagination. Representation and explanation follow observation and imagination.

NEIGHBORS AND FRIENDS.—(1) Mary, please name a number of your neighbors. How do some of them make a living? Describe the house in which Mr. Andrews and his family live, James. What are some of the things you like to eat best, Hazel? Please tell how the mail-carrier that just passed is dressed? How does Mr. Johnson water his cows? Can you tell why? (2) Children, this is a photograph of farm life in Holland. Tell me what you see, Harry. I will read you a very pretty story from this book; it tells about a little Dutch girl whose name was Wilhelmina. James would you rather live here or where Wilhelmina lived? Why?

ANIMAL FRIENDS.—(1) Karl, name your grandmamma's dear old pussy. Tell us what she liked to eat, where she slept, how she loved to be petted, what became of her. What kind of a pussy would you like to own, Clarence? Why? (2) This is the picture of a wild cat. Please pass it along to your classmates. Who in the class has seen a wild cat? Tell about it, Grace. On page 15 in this little reader you will find an exciting story about the adventures of a wild cat. Mary may read it for us right now. What would you do, Frank, if a wild cat tried to do the same thing to your sister? By and by we shall learn about a larger wild cat known as the "Tiger." I feel sure you will be interested. Our lesson for to-day is ended, but I want to see who can write the best "pussy story" to be read when we recite the next time.

OUR PLANT FRIENDS.—(1) Children, is n't this a lovely walk! We must try our best to get acquainted with a few of our plant friends, and then hurry home, for mother will want us. There, for example, is the little clover plant. John may talk with it a little while, and ask it all the questions he can think. Mildred may do the same thing with Mr. Cornstalk. While they are busy, we will get acquainted with this pretty grape-vine. John, how do you and your clover friend get along? Mildred, please tell what Mr.

Cornstalk does for his friends. (2) I brought this picture of a cotton field with me. You may look at it. To-morrow we shall read the story of a little colored boy and his sister working in a cotton field.

An Ocean Storm.—(1) Was n't that a fearful storm last night! Did you notice how it hurt the trees and houses all along the road to school? (2) This is a picture of a ship caught in an ocean storm. What do you think the captain of the ship and the sailors should do on such a ship, Ralph? How do you think boys and girls like you could pass the time if the storm lasted two or three days, Mary? (3) Let us listen to Paul while he reads this story of a storm on the Atlantic Ocean. This (pointing to it on a globe) shows you the roundness and shape of the Atlantic Ocean, but remember that it is so large it takes about 6 days for the fastest ship to cross. But Paul is ready to read. How should a captain like that be rewarded for his courage, Mark? (4) Would you rather be in a thick forest or upon the ocean through a three days' storm? Why? Look at the globe. Who can tell why the storm cannot force the ocean out of its bed?

Directions.—(1) (Handing a pocket compass to Frank) Please examine it. Let your classmates examine it now. What does the needle do even if you rotate the case? It always points one way. Yes, children, it always points North. Directly opposite is South. The sun rises in the East; it sets in the West. Florence may face the North and point to the East and West. (2) Now, children, North is on and on and on, no matter how far you go. It is so with all the "directions." (3) I will draw the four directions from the point where you stand, Florence. They are called the "Cardinal Directions," because they are thought and drawn from the centre or the heart. If I turned this paper up this way, the up-line is the North-line, the down-line the South-line, etc. (4) Who can tell why we ought to know these directions?

Lessons on the "Relative Directions" must be taken up in the same spirit, but not until the child cannot be confused by the difference. Thinking map-directions from the centre of the surface then in question should become a mental habit before the relative directions need be learned.

The Meaning of Maps.—(1) Ada, please name everything you can see. (The class is standing near a country school house.) (2) (Coming in and bidding all to be seated near the black-board) I will use marks or signs for the things Ada named, and will so place these marks as to show their distance and direction from each other. These dotted lines are meant for fences, that curving line for the creek, this one for the hill on which the school house stands, etc. This map (show them a map of the township, or state in which they live) is made for the same purposes. Let us try to understand the meaning of the many marks. (3) Please open your book on page 3. What do you find, Karl? A map of Pennsylvania. Tell us some of the things which this map helps us picture. Mary, please read what the book says about Pennsylvania. (4) Why do we need maps?

Free-hand map-drawing should begin as soon as the class has learned the meaning of maps as such pretty thoroughly. It will serve as a stimulus to careful study of the lesson-maps, and will therefore aid the geographical imagination and its necessary hand-maid, memory.

When book-prepared lessons become the regular thing, the recitation must be centred more and more in a serviceable wall map. All the geography the class can learn by the help of the pictures, diagrams, and maps of the text-book in use must be so perfectly transmitted to the wall map that henceforth it will stand for them all. This effect can be greatly heightened by the use of travel books, photographs, the souvenirs of tourists, etc. The wall-map should of course not have names, or else it will not be as fine a stimulus to the study of the book-maps. Relief maps and relief globes can be used with fine effect.

The Shape of the Earth.—(1) (Standing with the class near the school house) Children, notice with your eye where the earth and the sky seem to meet. What sort of a line would show this meeting, Mary? A large circle. How would you draw the circle to show what you could see from a mountain peak, Alfred? Much larger. What then do you suppose the shape of the earth to be if you could see far enough to see it all, Alice? Like a circle. (2) Yes, children, it would seem so, but the shape of the earth is more like an orange flattened at the top and bottom. Let us use this black ball instead of an orange. (A croquet ball blackened with ink, a darning needle through a gimlet hole for an axis, may be used.) What would happen if I started here with my crayon, and moved all around the ball without changing the direction, John? You would get to the starting point again after going all around. Well, children, that is just exactly what a girl by the name of Nellie Bly and other persons have done with the earth. What does it prove, Ellen? It proves that the earth is round.

Many interesting questions will arise, and the teachers must be thoroughly prepared for them. Additional proofs that the earth is round should follow as the class advances.

Day and Night.—(1) What have I done, Mary? You made the ball go round on the needle. Yes; let us call the needle the "axis" of the ball, and its two ends "poles." (Lighting an ordinary tallow candle, placing it on the table before the class, and rotating the ball near the candle) How much of the ball is brightened by the light, Karl? As nearly as I can see, about one-half, and the other half is dark. (This effect can be gotten perfectly by drawing all the school room blinds, or shutters.) (2) Children, the earth rotates very much like this ball. Of course you could not find an axis even if you penetrated to the place where it ought to be, but the needle-axis helps us think what takes place. The sun lights up one-half of the earth all the time, just as the candle would if you rotated the ball from East to West all the time. Who knows the effect on the earth? It causes day and night, Miss Johnson. That is the true answer, Mary.

Many questions will arise, many details must be woven into this topic. It will take many days to finish the lesson and to take up others growing out of it.

THE SEASONS.—The first lesson on the "Seasons" should not be attempted until the equator, the poles, and the north and south hemispheres have been taught. The seasons, as well as the preceding lessons should be taught with the candle and a globe or ball. (1) The present lesson should begin with placing the lighted candle on a table before the class. What did I do, Paul? You carried the ball all around the candle. I will do so again, and you may all try to see what I make the needle-axis do. Can you tell us, James? You made it lean in the same direction all the way round. (Holding the ball to suit the purpose) Does the light fall more directly on the upper or the lower half of the ball? On the upper half. And now? On the lower half. (2) Children, the earth goes round the sun just like the ball. The time it takes is called a "year." The course of the earth round the sun is called the "orbit" of the earth. The leaning of the imaginary axis is called the "inclination of the axis." Where the sunlight strikes the earth the straightest it is warmest. John, should we call the time when it is the warmest anywhere upon the earth Summer or Winter? Summer time. (Holding the ball to suit the purpose) What time is here just now, Mary? Winter. Here? Spring. Here? Fall. What name do we give to these year-times, James? I think we call them Seasons. Let us think about the seasons just a little while. Then follow all sorts of questions and answers on people, animals, plants, etc. Photographs, travel stories, specimens of products, etc., should be called into service.

Lessons on degrees, latitude and longitude, parallels and meridians, zones and bounding circles, polar seasons, phases of the moon, etc., should follow by and by. If the simplest kinds of lessons on these mathematical topics have been taught by the time the class has passed through an up-to-date book for beginners it is soon enough.

Teaching Intermediate Geography

The course itself, considered in connection with the apperceptive requirements and dominating interests upon which the course is built, must determine both the preparations for the recitation and the recitation methods.

Preparations.—(1) The intermediate text-book is fuller and harder. Longer lessons must be assigned, and the pupil must be made to realize that the lessons should be well prepared. As he grows mature enough he must learn to compare his text with other texts, refer to cyclopædias, consult the dictionary, draw maps, keep excursion note-books, etc. (2) The teacher must study both the lesson and his class. He must gather illustrative photographs, cabinet specimens, and travel stories. He must make himself the master of all the maps and globes to be used. He must draw the maps he hopes to teach. His library should contain all sorts of books on geography and the methods of teaching geography.

Intermediate Recitations. — Out-of-door observations should continue to be made to serve as point of departure for a world-touring imagination. Cause and effect should be emphasized a little more. Typical cases should be oftener pursued to the multitude of likenesses, or law. The " small whole " should often lead to the " large whole."

Excursions.—Neighborhood excursions with definite ends in view should be planned by the teacher. To keep these excursions from infringing on school hours, they can be announced the day before, and, if they cannot be attempted in the noon recess, they should take place after school hours or on Saturdays. No inconvenient expenses should be incurred, and the school community should not be offended by any improprieties of conduct. Note-book accounts should be required. These should contain both free-hand drawings of the observations made, and also full descriptions.

Supplementary Reading.—The intermediate course should include more and more supplementary reading. Such reading fills up the "text-book gaps," gives the dry-bones flesh and blood, accustoms the learner to look beyond the "one-book" world, and, by helping to make the "far-world" real, makes him "kin to all the world." Fortunately for the boys and girls of our day, good travel books, periodicals, and geographical readers, can be had in great abundance almost for the asking. No school board can be pardoned if they fail to provide the school library with these books, and no teacher should expect to succeed without them.

Map Drawing.—(1) The "map," as suggested, must become the permanent mental back-ground of geography. The boy who knows he must draw a certain map studies it with greater care, and thus in due time makes it what it should be—his own. (2) The intermediate pupil should draw free-hand all through the course. This kind of drawing serves practically all the purposes of drawing in the study of geography. The drawing of maps "by scale," so much emphasized some years ago, is seldom used in ordinary life.

Board Work.—(1) Blackboard work can be made a most effective exercise in systematic thinking and language. (2) The small class should be sent to the board on alternate days. If the class is large, half of the members may be sent to the board at once, while the other half recite to the teacher. When the writing time is up, each writer should read, while his classmates and the teacher listen. Mistakes should be corrected, and instruction added. (3) Some of the board-work should consist of maps, some of it should refer to the lesson text, some of it to field work done, etc.

ORAL WORK.—(1) The oral should cover pretty much the same ground as the written work, but from different angles. (2) Topics may be assigned and discussed as an exercise in connected thinking and expression, questions asked and answered to bring up details or test the preparation of the lesson fully, conversations brightened up by photographs, and reading from some interesting book may be carried on as an inspiration. The teacher and the class should both be on the look-out in papers and periodicals for current events that can be connected with the lesson of the day. The wall map, as said before, should be made the partner and thus the future mental stay of all the lessons taught.

WALL MAP DRILLS.—(1) Reviews may be effectively conducted by way of special map-drills. The old and the new can thus be organized into permanent possessions and significant connections. (2) Much interesting variety may be introduced into map-drills. Coast lines may be traced, some pupil may be sent on an imaginary voyage and describe what he sees and hears, commercial routes may be traced, etc.

Teaching Advanced Geography

Inasmuch as high school geography is so largely a study of cause and effect on a large scale, the method of instruction must of course become more and more scientific and comprehensive. The practical deductions should be forced right down to the large wholes of human life and conduct.

Advanced Political Geography.—(1) Field work something like the work attempted in the preceding course should be continued, but on larger wholes, and always with a definite problem of cause and effect in view. (2) An up-to-date high school text-book should be used. This will employ the student usefully and serve as thread for the teacher and the student. A good geographical magazine should belong to the school, luminous books on special topics should be read, and cyclopædias consulted. (3) "Scale" should become the custom in the drawing of the maps. (4) The high school course, like the course before, should be massed and organized into the student's mind through vigorous map-drills. (5) Logical outlines should be adopted and employed in the mastering of lessons and the recitation of the same. (6) Board work and oral work should supplement each other. A fine large globe should be used in connection with the recitations.

Mathematical Geography. — (1) A thorough and detailed explanation of the globe should be undertaken by the four year high school. (2) The school should be well equipped with the necessary apparatus, such as the tellurian, the planetary system, etc. (3) A course in spherical projection should accompany the mathematics.

Commercial Geography.—(1) A real live text-book on farming, mining, manufacturing, etc., should be made the back-bone of commercial geography. Special stress should be laid on the study of transportation lines and the markets of the world. The treatment of the subject should be largely physiographical and logical. Explanatory maps and enriching photographs should accompany the text. (2) Wall maps exhibiting the larger truths of the subject should be made the backbone of the recitations. (3) The student should be taught to consult leading journals, market value columns in the papers, etc. (4) A cabinet of commercial products representing all the larger interests of the world is much to be desired.

Physical Geography.—(1) The course in physical geography should run parallel with the other high school courses. (2) The text-book used as thread should be logical, but not so abstract in treatment and so dry in style. (3) A good relief globe and relief maps should accompany the text-book. (4) The school should own good text-books on all those sciences which physiography invades, and without which it cannot be perfected. The student should be taught to consult these books. (5) Time should be found for field work enough to give the book and the globe concrete content, and to start the student in intelligent physiographic habits for his future.

The Value of Geography

As a mental exercise geography is capable of great things. The knowledge gained is itself a most important acquisition.

As a Mental Exercise.—(1) The direct observations upon which the teacher of geography must constantly insist, make the study a superior exercise for the senses, or perception. (2) The detailed mental construction of "the far" through "the near" combines imagination apperceptively with the memory most effectively. (3) The modelling, free-hand drawing, together with all other modes of representing both the near and the far, that should be required in geography, correlate the judgment most effectively with imagination and the memory. (4) The determined search after likeness, or type, both of wholes and relations, makes geography, especially in higher grades, a splendid exercise in scientific reasoning. (5) Conscious emphasis on the fundamental fact that geography is the study of the earth as man's physical environment, with which he must struggle, to which he is bound to adapt himself, and which thus makes all men "kin" both in failure or success, broadens human sympathy into wider brotherhood, and tends to make the individual the citizen of the universe.

As Knowledge.—(1) Geography, as we have seen, encroaches upon many sciences, and thus serves as introduction to them all. (2) It is the necessary correlate of history, travel, commerce, news, etc. (3) To some extent it is a substitute for travel and for history combined.

Training of the Teacher of Geography.—(1) Extensive training in the subject itself is the first necessity. Such training will put the teacher at ease with himself and his pupils. It will act as inspiration and in consequence as stimulus. (2) A thorough knowledge of maps, globes, drawing, modelling, etc., is extremely important. (3) Last but not least in importance is a thorough understanding of the methods and the purposes of out-of-door observations, or " field-study."

The History of Geography

A complete history of geography, interesting as it might be, and suggestive to the teacher, would be quite beyond the compass of the present treatise. A glimpse into the subject must suffice.

Famous Writers.—Geography is really as old as history, and may be older. Eratosthenes, the librarian of Alexandria, was the first great Greek writer (276–194 B. C.). He wrote an extensive work which remained in authority for two hundred years. " He reconstructed the map of the world, used parallels, meridians, and poles, established five zones, and with a gnomen measured with considerable accuracy the size of the earth." Strabo (66–24 B. C.) undertook to describe the world in seventeen books. He believed the earth to be spherical, but immovable, and surrounded by the heavens. " Greek Geography reached its highest development in Ptolemy's work, written about 150 A. D." He believed the earth to be the centre of the universe. The Roman Pliny and others followed in the footsteps of the Greek geographers.

Mediæval geography, for reasons which we cannot now enumerate, was speculative and fantastic rather than real and scientific. The most important authors were Solinus and Cosmas. The former culled his matter from Pliny, but was chiefly occupied with entertaining " tales about birds, beasts, reptiles, etc.;" the latter wrote a biblical cosmography, and tried to prove with selected texts that the earth was not a sphere.

Toward the close of the 16th century geography began to receive much attention in the schools. In 1582 Michael Meander wrote a concise description of the world, and pleased the teachers. It was used until the middle of the 17th century. Somewhere in the neighborhood of 1670 Bernard Varenius wrote his "General Geography" and founded modern physical geography. Humboldt, Ritter, and Ritter's disciple Guyot, followed after 1850.

Jedediah Morse wrote the first American school geography in 1774. In 1856 Cornelius Cartee wrote a very readable school geography. Warren's well-known books came in 1872. Frye and others followed in rapid succession.

History of Methods.—(1) Strabo criticised the "ancient geographers." He believed in observation and the scientific treatment of the subject, but the Middle Ages cared much more for his myths and tales than for his real worth. "The discoveries of Copernicus and Galileo and the voyages of Columbus and Magellan did much to awaken inquiry and stimulate observation of nature." Bacon, Comenius, Rousseau, Pestalozzi, Froebel, and all important teachers of geography since then, have made observation fundamental. (2) These educational reformers have also emphasized the great importance of thinking "the far" through "the near." (3) "Map sketching arose in Greece before text-books were written. The Greeks gave much attention to maps. Ptolemy was one of the first to make the map central in geography. Many teachers since have made the map the centre of instruction, and emphasized map drawing. Basedow and Salzman were the first to make large use of pictures and relief maps. We now have the use of many methods of representing relief and our geographical texts are veritable medleys of pictures. The Germans use large wall pictures instead of many pictures in the text-books. Their atlas is also separate from the text. Many American schools are now equipped with lanterns and series of slides illustrating the various topics and countries considered in the study of geography." (4)

" The advance in scientific geography during the past half century has been great, and has done much to improve elementary methods, but we have erred in trying to force children to use the scientific method. The reaction has already begun, and must ultimately end in adapting both methods and materials to the developing abilities of the child." (5) The work of adaptation has begun in real earnest. Many schools provide for out-of-door observations and excursions. " The recognition and definition of land and water forms are learned mainly before the pupil begins the regular study of a text-book. The study of the text-book is begun with few exceptions with the fourth year." Maps and map-making appear most often in connection with the land and water forms, as early as the third year. There is a strong tendency to defer the globe or " the earth as a whole " to the fifth year. " In the study of the continents, North America stands first, Europe second, and South America third." In several cities commercial, mathematical, and physical geography are studied in the higher grammar grades. The adaptations in method are even more thoroughgoing. The suggestions of the educational reformers are subjected to rigid tests, and are being adopted as fast as tested. Genetic psychology has made it possible to make the latest tests most convincing.

Supplementary Reading.

1. Educational Reviews, June, 1892, February, 1893.
2. Pedagogical Seminary, March, 1907.
3. Present Status of Geography. Am. Education, December, 1907.

CHAPTER IX

HISTORY

The Nature of History

As said before, the subject to be studied determines the mental action, the courses of study, the methods of instruction, and the value of the branch.

The Matter of History.—In the broadest sense all events, together with their causes and effects, constitute the matter of history. As commonly used the term " history " denotes the study of *events involving man.* The study of events involving man has centred largely in warriors and rulers. But social customs, occupations, institutions, marked achievements in the world of thought, etc., deserve a larger share of attention.

History as Science.—(1) Ordinarily events, together with their causes and effects, are ascertained *as facts,* the study ending there. This amounts to observation—nothing more. (2) When events like wars, treaties, customs, institutions, etc., are compared to ascertain the *likenesses* of cause and effect, history becomes induction, and rises to the dignity of science; for the likenesses that can be ascertained are really the laws of human will in action. (3) When the citizen shapes his course in the state in conformity with laws of cause and effect as found by inductive study of events, or the statesman undertakes to forecast events by comparing causes now in operation with the causes of the past under like conditions, or any man builds his character according to the laws of cause and effect as seen in biography, the process is deduction.

In short, history is really *the science of events* only when by comparison of cases it mounts from facts to principles, and applies the principles discovered to the problems of the present and the future.

The Psychology of History

The study of events is a very interesting mental process.

Observation.—If the learner could always be where an event occurs, observation would of course consist of sense-perceptions reinforced by judgment. But, since past and far-away events can be studied only "through report," imagination must be substituted for perception, as when, for example, we mentally place ourselves at William Penn's side in the famous treaty scene or cross the Alps with Hannibal.

When the events to be pictured are geographically large, when multitudes are involved, and the causal nexus is obscure, as in the battle of Gettysburg, the study process grows difficult.

Induction.—The possible combinations of cause and effect in the sequence of events are so numerous and complex that perfect likeness, or law, is very hard to prove. When, for example, we compare uprisings against established forms of government, we find that the causal combinations differ very startlingly, and that combinations which sometimes produced rebellions did not always do so. The one thing that has thus far always been found in these causal combinations which produced rebellions is an outraged sense of justice. Slavery, tyranny, "taxation without representation," etc., are examples. Put into syllogistic form the argument might be stated:

1. An outraged sense of justice led to all observed rebellions;
2. The analogy, or likeness, seems to be generic.
3. An outraged sense of justice will always produce rebellions.

The first premise of such arguments in history must evidently be based upon the widest possible range of exact observation, and the second premise must be very modest. And yet, unsafe as inductive arguments in history appear to be, the maxims that "experience is the best teacher" and that "history repeats itself" crystallize the well-supported conviction that, after all, men and nations act very much the same way under exactly the same conditions.

Deduction.—The one difficulty of deductive arguments in history is the difficulty of determining that new causal combinations are completely like those causal combinations whose effects we already know. The syllogism might be stated thus:

1. Injustice to colonies has always caused resistance.
2. If England is unjust to India,
3. Resistance will occur there.

Great as the probabilities are in support of this conclusion, only the event itself could confirm it. Counter-causes never present in past rebellions might keep India from rebelling under conditions otherwise completely alike. In other words, the first premise is really only a "particular" proposition, as we say in logic, so that this apparent deduction is only an argument from one particular truth to another, and for that reason logically invalid.*

THEORIES.—Three theories, or explanations, of events have originated from the difficulty of determining primary and secondary causes. (1) According to some thinkers, the Russo-Japanese war of 1904, for example, was the result of causal complications over which the combatants had no control. This is the "materialistic" theory of history. This theory attaches neither praise nor blame to either party—holds neither party morally responsible, and is therefore wholly out of harmony with the conclusions of Christian ethics. (2) According to another fatalistic school of philosophy, called "Theists," from the Greek word θεός, meaning God, this war was brought about by God. The combatants had no choice in the matter; it was to be so, and could not be otherwise. This theory is certainly a libel on the character of God, and fails to account for the moral nature with which we all know we are gifted. (3) According to another theory, situations serve as motives, God concurs with men and nations, while these, moved by situations or by God, act in freedom which makes them morally responsible. This is the "Spiritualistic" theory; it accounts for all the facts. The teacher of history that does not impress upon his pupils the responsibility of men and nations and the final justice of Providence is hardly a safe moral guide for boys and girls.

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* The names of persons, places, etc., without which it would be awkward to tell what we picture and think in history must evidently be memorized. This is eminently true of dates that help us think about lapse of time and causal sequence.

TEACHING HISTORY

The subject-matter of history, like the subject-matter of other studies, must be distributed into courses.

History Courses

The course for beginners should be very interesting. The next course should pave the way for larger wholes. The last course should be determined by the needs of culture and the needs of life.

Course for Beginners.—As a rule, the child takes much interest in the life and doings of the neighborhood to which he belongs. The questions which a ten-year-old boy will ask about the things which happen round about him show that events are more than sights and sounds to him—show that he can think causal consequences. With a little preparatory training in geography, children become interested in current events into which they can be transported by imagination. The child-life of other lands and other times is absorbingly interesting to the average boy and girl. The trained teacher will find the necessary lesson-material partly in the life of the modern world, and partly in the legends that portray the customs, occupations, undertakings, and achievements of the human race in its childhood.

Intermediate Course.—The purpose of the second course in history is to supplement the work of the first, or story-course, and to pave the way for complex combinations. To keep in full control of all the possibilities, interest and ease must continue to dominate over use and completeness in the choice of lesson-subjects. Hero-history serves all our purposes. Those heroes through which we can give learners their best "first-view" of history-epochs should, of course, be studied first. Around these as centres we must cluster secondary heroes and the situations thus produced. The events thus introduced dare not be geographically large, the multitude involved must not overwhelm imagination, and all relations in the sequence of events must be obvious.

Higher Courses.—To perfect the work for which the way was paved in the hero-course, and to add what the larger possibilities of study and approaching graduation may require, are the special purposes of higher courses. Complex combinations, such as wars, treaties, industries, and institutions, now command full attention. Nations and world-epochs must be mastered more and more in detail. Laws must be proved inductively, and then applied to present problems.

Lesson Methods in History

The mental necessities of history determine all the methods of preparing and reciting lessons.

Methods with Beginners.—To serve the purposes in hand, both the teacher and the pupil must prepare the lessons.

Preparations.—(1) The teacher of beginners in history must provide himself with the legends and local history by means of which he proposes to reach the child's senses and the child's heart. Fortunately for the modern teacher of beginners, this mass of lesson-materials has been brought up to the very school-house door by specialists in history-literature. The teacher must, however, not simply provide himself with needed lesson-material; he must prepare himself to give it to the class in the story-way. The pictures, blackboard, maps, etc., by means of which the child's imagination, reasoning, and memory are to be reinforced, should be ready for use.

(2) In the story-course of history, beginning before very much reading power has been acquired, the pupil should not, as a rule, be required to make text-book preparations for history-recitations. The class should, however, have access to well-written travel-history booklets, such as the "Little Journeys" published by the A. Flanagan Company, Chicago, Ill. These should be read at leisure times and at home.

Recitations with Beginners.—(1) A part of the time to be devoted to the recitations of beginners should be spent in reviews. While some one tells connectedly what the teacher taught on some previous occasion, the rest of the class must listen sharply, ever ready to add what may have been omitted, always waiting for a question, eager for a fuller explanation. As a rule, the pupil should stand gracefully erect while reciting, and speak both plainly and fluently. (2) The reviews should be followed by instruction. The teacher should strive to give this instruction charmingly, threading his way vividly through events from cause to effect with as little deviation as possible. Special pains should be taken to impress the few necessary dates and proper names. (3) Instruction should be followed by tests. These tests may consist of questions and oral answers, of topics assigned and orally discussed, or, if time permits and the class is otherwise prepared, of board assignments and written answers. The written work should be read by the writers, with or without comment, as the teacher finds best.

Methods with Book Classes.—The "book" introduces special features, both into lesson preparations and lesson recitations.

Lesson Preparations.—(1) The teacher of classes using text-books should study the lesson-text. Much confusion often results from violation of this requirement. To inspire text-book classes in history, he must know enough to enlarge on every lesson. Supplementary texts and cyclopædias should therefore be consulted by the teacher, maps should be studied, black-board drawings should be practised, way-paving and supplementary talks should be prepared, oral tests should be planned, numbered questions should be prepared for black-board work.

(2) The intermediate class should be required to prepare assigned lessons by means of text-books specially prepared for the purpose. In these books the descriptions should be delightfully vivid. Pictures and maps should heighten this effect. The learner's reasoning should be taxed only with the obvious sequence of events, and his memory only with epoch-essentials. The habit of studying the pictures and maps connected with the lessons should be formed as soon as possible. Pupils of this grade should be encouraged to read travelogues like those of Burton Holmes, published by the McClure Company, 44 East 23rd Street, New York, the "Historic Tales," by Morris, published by the J. B. Lippincott Company, Washington Square, Phila., Pa., and also the biography of great men and great women.

(3) Advanced classes should master assigned lessons by means of an advanced text. The book used should lay considerable stress on the physiography of events. Additional text-books, cyclopædias, wall-maps, monographs on special epochs, etc., are the indispensable aids in the fuller comparisons which advanced pupils ought to be required to make. As fast as pupils become mentally ready, they should be required to discover likeness, or law, in the course of events, and to think of these laws in connection with current events. The current events to which newspapers and magazines call attention should be connected with the lesson preparations. Historical novels like "Ramona," "The Crisis," etc., should be found in school libraries.

(4) The first text-book for general history classes should be rather ethnographic than synchronistic in plan,—*i.e.,* the story of a nation should not be tangled much with any other nations in any given epoch until such synchronistic complexity is no longer too hard for the student. Presently, however, if the history of any nation is to be understood in all its epoch-settings, the synchronistic text-book becomes a necessity.

Recitations of Book-classes.—To accomplish the usual recitation-purposes, text-book classes should be required to do both oral and written work.

(1) Questions prepared by the teacher, numbered logically, should be placed in order in the board-trough. These questions, beginning with reviews, should exhaust the lesson apperceptively and make it necessary for the pupil to use those mental faculties which ought to be used in a history lesson. (2) At a signal from the teacher the class may rise. Having counted off about half the class, he should send these to the board, each one to the place indicated by the number given and the number at the top of the board. Each pupil should write his name at the top of the board to which he was sent. Then, picking up the question in the board-trough before him, he should write it just as it is and as near to the top of the board as possible. A long separation line should be drawn under the question. The question should be answered in several headed paragraphs, as indicated by underlined words or by other devices. (3) When the time to be used by the writers has been consumed, the board-work should be examined. Each writer should read in order, the class paying strict attention. Oral questions, important instruction, map drills, criticisms, etc., may be connected with this reading.

While the board-pupils do their work, the rest of the class should be engaged in oral work. This oral work may consist of questions and answers, or topical recitations, but should not cover the same ground as the board-work from the same angle, or with the same set of questions, lest the writers be tempted to keep one ear open for anything that may help to answer the board questions. The recitation should close with the assignment of a new lesson, and this assignment should be accompanied by such instruction as will serve the purposes of the lesson preparations. In case of younger book-classes way-paving talks and supplementary talks should frequently take the place of the regular recitations. These talks, as well as the regular recitations, should be reinforced by maps, drawings, photographs, relics, etc. No books should be allowed in class.

Value of History

The study of history is the means to the end in valuable culture, and serves most useful purposes in life.

Culture.—(1) The study of events *through report* makes imagination the first necessary mental action. (2) The endeavor to cumulate and classify events upon the basis of likeness in cause and effect is a splendid opportunity for inductive reasoning. The application of the laws thus ascertained affords exercise in practical deduction. (3) To be a lasting mental joy the pictures of events which the learner builds in his imagination must be permanently held in memory. Then, too, the cumulating process of inductive reasoning in history depends for success on perfect memory. And to be of use to any one, the laws of history as found inductively dare not be forgotten.

Life.—(1) The study of events "enlarges the naturally narrow personal horizon of the young" by transporting them, as it were, to other times and other lands. (2) The habit of tracing causes to effects in the course of events—a habit which good teaching of history develops—can be ripened into the highly profitable discovery of laws in war, politics, economics, finance, morals, etc. This inductive vigilance prepares for deductive foresight in citizens, statesmen, and men as men. (3) Above all, as thinkers like

Luther, Arnold, Carlyle, Schmidt, and Bunsen saw, the mind that sweeps through many centuries and many lands comes to realize the law of final justice in the providence of God. This moral and religious appeal is worth infinitely more to the average boy and girl in their "teens" than formal lessons in morals and religion. It is more picturesque, dramatic, concrete.

If, however, the study of events is to have these cultural and practical results, the matter to be taught must really be an epitome of life, and the learner must be required to master this epitome with realistic reason. The learner should not be allowed to "commit" the language of the text in use. The necessary drudgery of learning names and dates should be lightened whenever this can be done without injuring the feeling of "passing time" in the course of events or the credit which belongs to persons and places in relating events.

TRAINING OF HISTORY TEACHERS.—The possibilities of history as a means to ends in developing the mind and fitting boys and girls for life, depend very largely upon the history-teacher. (1) The teacher of the story course and the hero course in history must know the necessary lesson-matter, and the most effective modes of presentation. (2) To make the history-class think the causal nexus in a course of events, as the Revolution of the American Colonies, the teacher must know the European history that led up to the Revolution. (3) To make the study of immigration, territorial expansion, money panics, etc., inductive comparisons, the teacher must know the instances to be compared. (4) To make the inductive discovery of likenesses or laws effective, the teacher must be able to think inductive conclusions deductively into problems of character-building, citizenship, and statesmanship. (5) To make history stand for its highest moral possibilities the teacher must emphasize the freedom of action in men and nations, and thus develop the sense of moral responsibility together with respect for the final justice of Providence. (6) The prospective history-teacher must secure such training partly in the higher courses offered in the course of his academic or collegiate education, and partly in the Normal school.

The History of History

The evolution of history and the place which history has won in schools are both deeply interesting.

Evolution of History.—History began with hero-tales, or legends, and epic poetry. As far back as the Chaldean Sargon, kings caused records of their reign, or at least of grand achievements, to be made. The kings of the Tigris-Euphrates valley caused clay-tablet records to be made; those of the Nile resorted to hieroglyphic inscriptions on monumental pyramids or papyrus scrolls. Many of these ancient records have been deciphered. The Greeks and Romans have left us very complete accounts of their achievements and civilization. Until about the middle of the 19th century A.D. historians made no scientific attempts to "explain" events. History began to become a science through such writers as the French Guizot in the reign of Louis Philippe. It is only within the last fifty years that inductive and deductive comparison of causes and effects have been somewhat successfully accomplished.

The Place of History in School Programs.—The study of events did not have a very conspicuous place in the schools of the ancients. Only those who belonged to the ruling and priestly castes studied history. The place which history occupied in the school systems of the Middle Ages was very humble indeed. Until it began to become a science, educational critics like Alexander Bain and Herbert Spencer relegated history to the rear as means to ends in education. Now that history has become a search after likeness or law in the course of events, thus leading to better citizenship, to better statesmanship, and to better moral insight into Providence, it has begun to occupy a proud place in popular as well as in higher education. The study of history has made its biggest strides in the schools of Germany and France, where it has become decidedly comparative, or scientific, in presentation. It is only lately that history is beginning to occupy its proper place in the schools of the United States.

Supplementary Reading.

1. Educational Review, May, 1891, November, 1894, April, 1895, Dec., 1895, Sept., 1896, Dec., 1898, Feb., 1899, Dec., 1899.
2. Pedagogical Seminary, September, 1905.
3. N. E. A. Reports, 1889, 1895, 1897, 1902, 1905, 1907.

CHAPTER X

DRAWING

The Nature of Drawing

In drawing, as in other branches, the matter to be studied determines the courses and methods.

The Subject Matter of Drawing.—(1) The first mental object, or object of attention, in drawing is the outline, or form, of sensible objects and movements, as faces and swinging, for example. (2) The second mental object, or object of attention, in drawing, is the representing process of which drawing really consists, together with the necessary physical positions and movements, as when we stand at a blackboard and represent a hat as falling thus:

Briefly summing up, we may say that *Drawing is the process of representing objects to the eye as one thinks about them or as they themselves appear to the eye.*

Species of Drawing.—(1) When the draughtsman does not help himself with ruler, compass, etc., it is known as "Free-hand Drawing." (2) If such helps are used, the drawing process is known as "Mechanical Drawing." (3) When the effect of distance is expressed by means of converging and receding lines, it is known as "Perspective Drawing." (4) When the purpose of drawing is to serve the useful arts, such as carpentry, masonry, etc., it is called "Industrial Drawing." Industrial drawing may be "Conventional" or "Inventional"; it may be "perspective," and is usually "mechanical." (5) When drawing is "used in the service of the fine arts, or beauty," it becomes either "Ornamental" or "Artistic," and may be either "conventional" or inventional. Inventional drawing is commonly known as "Designing." "Painting," from the use of colors, and "Engraving," from the use of special tools and materials, are varieties of drawing. (6) Geographical Drawing is known as "Map Drawing."

The Psychology of Drawing

Within the last twenty years both experimental and genetic psychology have made most valuable contributions to the pedagogy of drawing.

Observation.—(1) Pure form, or outline, as specialists have proved conclusively, cannot be directly perceived; it must be inferred from color-values, as the case of cured blind persons first suggested. (2) As a sense impression, "pure form" is so much found in company with other sense impressions, such as motion, tone and touch, that we seldom recognize even intimate friends or familiar objects by "pure feature" alone. To become an adept in discerning form, one must really resort to deliberate and persistent exercise in such discernment. (3) The principal reason why most of us have not acquired the power of acute discernment is because in childhood, and ever since, most of us have not felt the need of such discernment. We could get along without it in the ordinary course of life. This neglect of course becomes mental habit, and, unless corrected, it arrests development. (4) The discernment of feature, or form, can be greatly promoted, at least in early years, by observing imitative representations of such features, or forms; but at first and for quite a long time the features of the objects to be observed should be so striking, and the representation of such features so evident in purpose that there can be no mistake in the learner's mind.

Induction.—(1) Attention to form as a quality of objects leads to comparison of forms, and this to the discovery that forms—all forms indeed—are easily classified under a few heads, as sphere, cube, cylinder, cone, and pyramid, or derivatives from these. These likenesses, or "types," may accordingly be called the "laws of form." (2) Attention to direction, length and expanse of lines in the drawing process leads to comparison of modes in representing direction, length, and expanse, and this comparison in turn leads to the discovery that convergent and receding lines will always represent direction in perspective, as in drawing railroad pictures; that the proportions of an object to be represented can be faithfully maintained in the drawing by adopting the same proportions in the lengths of the lines employed, as in drawings used by architects; and that the sensible character of surface can always be represented by expanse of line or color, as in shading, description of grain of wood, painting, etc. These three linear likenesses, or types, may be called respectively the laws of "perspective," "scale," and "shading"; or, the "line-laws" of drawing.

The learner is prone to close his mental eye too soon to new possibilities in selecting what should become habitual in perspective, scale, and shading. If, for example, the converging lines employed in his early lessons in perspective always meet in the same way, as in drawing railroads, wood paths, etc., he will drop mentally into that perspective style; if the faces of people represented in his early lessons are always profiles, that will tend to become the style; if he uses inches for yards, that may grow to be the habit; if he shades his pictures on the right side, that may become the tendency. This arrest of development must of course be met by remedies.

Deduction.—(1) Deduction in drawing is, on the side of the mind, the analysis of objects into known type forms, together with the representation of form facts in objects or movements, on the side of execution, in obedience to the laws of perspective, scale, and shading. (2) The possibilities of arresting development at various stages of imperfect induction, makes abundant deduction a mistake before the epoch of accurate technique.

The Physiology of Drawing

It is a question whether the pedagogy of drawing owes more to modern psychology or to modern physiology.

The Pupil's Eye.—(1) It has been proven very conclusively that drawing is capable of great abuses to the eye. (2) It has also been shown just as conclusively that many bad results can be prevented by reasonable precautions. Among these precautions are the following: The light should come from the left and from above; it should not be blinding nor dim. The drawing period should end before eye-fatigue sets in. Suspicious eyes should be tested by the oculist, and, if need be, supplied with proper glasses. All board-work set for copy should be definite and large. When drawing at the board, the pupil should not be allowed to bring his face too near the board. All eye-straining methods of drawing, " especially the so-called Stuhlman method which consists of drawing by the aid of a net work of fine lines, points, and the like " for guiding purposes, must of course be avoided.

Body Positions.—(1) Comfortable desks and seats should be provided. (2) The sitting posture should be comfortably upright and adapted to the purposes. (3) The forearms should rest lightly on the desk, and the hands should almost meet on the writing surface.

PENCIL-HOLDING.—(1) The pencil should be long enough to let it rest against the hand between the thumb and forefinger. (2) The pencil should be grasped about an inch from the drawing point. (3) In preparatory sketching the pencil should meet the writing surface at a small acute angle, but, in " filling in," almost at right angles. (4) Prepared drawing pencils should be used. (5) The colored crayons should be absolutely free from poisons; mouth, nose, and eyes should be guarded from the dust that may arise.

Drawing Movements.—(1) Statistics show that large free movements are easier at first than small constrained movements, and that curves are easier than straight lines. (2) We should therefore proceed from the former to the latter in requirements, and the blackboard with its great capacity for the former should be used much more than the tablet.

Plenty of Practice.—(1) It has been conclusively proved by physiologists that in the ripening of muscular control visual impulse gains rapidly over muscular impulse. In other words the will is reinforced more by the eye than by the muscular sense in the process of getting fuller and fuller control of the muscles. (2) The eye should therefore be allied strongly with the will in drawing lessons, and there should be plenty of practice.

Courses of Drawing

Modern psychology shows that not apperception, but dominating interests, pointing to ripening capacities, should be emphasized in organizing drawing courses. The necessary readjustments will be completely consistent with all the ordinary interests of utility.

Course for Beginners.—(1) Up to the age of nine, as statistics show, children care most of all for dramatic situations. This interest centres most of all in stories radiating round the human figure. Imaginations involving animals, plants, and houses are quite acceptable. "Still life" stories please very much. Mechanical inventions, geometric designs, and ornament attract only the unusual child. Coupled with this dominating interest in story-life, or happenings, is an absolute and unflinching courage to draw anything and everything that belongs to the story-life. In all such cases the ability to draw what the child so courageously attempts to draw evidently comes with the ripened impulse. The "complex" of adult apperception seems to be ignored with impunity by courage such as this. Imagination here over-rides all else. The command to pay attention to the features of an object to be drawn may be followed by a hurried and disdainful glance, but the interruption over, the story-drawing child will eagerly continue to express to the eye what he has in mind relating to the object rather than the thing he could see before him. Objects not related to the story win next to no attention. (2) Only one conclusion can be fairly drawn: What beginners need is a courageous course in rude representation of child-imaginations, dramatic happenings, etc., rather than a course in drawing from the object directly. The story-literature now so plentiful, together with the story-lessons of the ordinary school readers, and the inventions of the teacher, should furnish abundant material.

The Intermediate Course.—The intermediate course in drawing should begin in the neighborhood of the age of ten or eleven and continue through the grammar school. (1) From about the age of nine to thirteen other interests begin to gain upon the interest in story-life or happenings. The real object itself becomes more and more important to the mind, and the drawing must be more and more representative. Details of feature are emphasized more and more. This emphasis on details, however, leads the child at times to include in the picture what he cannot see at the time, as when he draws both eyes in a profile face, or the inside of a box, or the hat pin through an apple, etc. The courage of the story-drawing epoch slowly gives way to self-consciousness, and the "complex" of adult apperception is less and less ignored. The ripening interest in objective details is coupled with rapidly ripening control of the drawing muscles. (2) The course for these years should therefore be based more and more on present sense-perceptions. The drawing should be free-hand to prevent fatal arrest of development in courage and imagination. Accuracy, or faithfulness to details, should be encouraged, but it should not be magnified in importance. The gradual ripening of motor control, together with pure form, beauty, use, and other interests, suggest introductions to geometric types, easy perspective, water colors, conventional ornamentation, mechanical drawing as related to the tasks of manual training, and free-hand map-drawing in connection with geography, etc.

Advanced Course.—(1) A new courage is ushered in with adolescence; it is commonly coupled with the strong determination to succeed at any cost. The many interests, such as those of pure form, beauty, use, etc., which nature held in abeyance up to the early teens, now become intensified and must be recognized. (2) Technique should evidently now be emphasized. A strenuous combination course in designing, perspective, industrial and mechanical drawing, map-drawing by scale, painting, engraving, etc., may be taken up by those who have the time and the opportunity.

TEACHING DRAWING

As in other branches, so in drawing, the relation of the subject-matter to the learner, should determine not only the course but also the methods of instruction.

Material Equipment

The necessary story-literature should be abundantly provided by the school. The supplementary readers, as well as the recitation readers, should contain some of this literature. Plenty of good blackboard surface and regulation drawing tablets, together with the necessary crayon, pencils, rules, compass, etc., should of course be provided. The "copy supplying" drawing book is a relic of the past. It is too dead to serve as an approach to the "story child's" imagination, and it tends to arrest growth in direct sense-perception. The drawing room should be furnished with a collection of interesting plaster of paris models, geometrical forms, natural history specimens, products of fine art and manufacture, etc. The room and the desks and the seats should be suited to the purpose.

Methods with Beginners

Recitations in any branch are more likely to be pointed as to means and ends when right preparations precede.

Preparations.—With beginners in drawing the brunt of the preparation falls on the teacher.

The Teacher's Preparations.—(1) The teacher should choose the story to be drawn and prepare to use it with effect. (2) He should see to it that the materials to be used are in shape and in place. (3) He should make all the necessary hygienic preparations.

The Beginner's Preparations.—(1) When the beginner grows a little older he may be requested to find a story or occurrence that he thinks he can draw. (2) He may be asked to try his hand on such selections between recitations. (3) He may be encouraged to furnish "still life" materials in accordance with directions. (4) He should come to class with tablet, pencil, water color outfit, or colored crayon outfit, if so required by the school, and his hands should be clean.

Recitations with Beginners.—(1) There are several ways of starting in with a class of beginners. The teacher may request some member of the class to tell about little incidents, and show how to sketch these incidents, using nothing but suggestive lines, dots, etc., as in telling how the Brownies marched across the little hill. The teacher may begin the lesson with the telling of a well-selected story, which he may then pleasantly ask a piece of crayon to tell by means of lines, dots, and marks. (2) After that the children try to tell another crayon story or describe other incidents. (3) The attention of the child should be called to such incongruities as six fingers on a hand, two eyes on a profile face, arms longer than the body, etc., and the invitation given to correct such mistakes; but the child should not be pressed too hard. (4) A happy mood should be cultivated. (5) The rules of hygiene must be obeyed. (6) After the first few lessons the courage of the class will rise to almost any situation. Subsequent recitations will differ from each other only in the content of the story or the interest that attaches to corrections of mistakes. The recitations may begin with a story told by mouth and end with the crayon or the pencil telling it often enough to suit the corrections, or they may consist of a crayon-story by the pupil, an attempted interpretation by the teacher, and a free telling of the story by the pupil.

Johnny and the Red Wing.—(1) Once upon a time a little boy whose name was Johnny, and who lived near a meadow, saw a pretty red-winged bird in the meadow. He ran after it and tried to catch it. But it flew so high that he could not watch where he ran. A little way ahead there was a creek. All at once something happened. Who can tell what it was? (Mary raises her hand and tells.) (Turning to the board) I will let the crayon tell what happened. (The class is pleased.) Whose crayon can tell how Johnny looked before he reached the creek? (Paul undertakes the job, but fails to tell all that the teacher wants.) Suggestions follow, and the story grows better. A few incongruities are noticed and corrected, and the lesson may be brought to a close, or continued. Sometimes a story is so full of dramatic situations that it may be used for many recitations. The lesson may be made to consist of questions leading to imaginations, which should be drawn, as when the teacher asks, Who can make a boy climb a fence? Who can make a cat run after a mouse? Who can put a flower-pot on the table? etc.

Intermediate Methods

The methods to be used with pupils of the grammar grades must of course be suited to the new relations.

Preparations.—The complex relations that arise in the course of drawing for the grammar grades call for very detailed preparations.

The Teacher's Preparations.—(1) The teacher of the intermediate class in drawing must choose the objects to be used in the recitations. He must practice "placing" them to prevent confusion in the observation of the outlines. (2) He must think out a recitation plan. (3) All the important and hygienic provisions must be made with judgment.

Preparations by the Pupils.—(1) The pupil may be required to assist in preparing the room, the board, the pencils, etc. He may take part in bringing and the placing of the objects, models, etc. (3) He may be required to draw for practice between recitations and according to directions.

The Intermediate Recitation.—(1) The first thing to do is to cause effective form-observation of the object or the drama to be represented. To some extent this task can be accomplished by first calling attention to certain features of the object and the teacher then drawing. Temporary resort to this device may be permissible at first, as an apperceptive approach to pure form, or outline, but to make a practice of it is really vicious; it centres attention too much in the teacher's drawing of the object, and thus hinders or arrests growth in attending to the form features of objects themselves. The more effective way to emancipate the drawing pupil, though it may be just a little slower, is to centre the attention on the form-features of the object itself. (2) This direct form-observation should be followed at once by courageous free-hand attacks upon the object by the pupil. Incongruities should be corrected. (3) Accuracy should be emphasized a little more every week without tyranny. (4) There must be much repetition in type work in order to perfect muscular control, but the repetitions should be brightened very much by introducing variations. This will prevent arrest of development in observing power. (5) Geometric type forms must become the under-current of the course increasingly. These must be observed, converted into forms of art and nature, and recognized in the child's surroundings. (6) The map-drawing lessons must be correlated with the requirements of the grade in geography.

Typical lessons are appended to illustrate the spirit and the method to be used.

Drawing from the Object Drawn.—The object chosen for the present lesson is a broad brimmed high crowned hat. Its relation to the human figure and its graceful lines win attention. (1) What kind of a line did I draw in the air around the crown of this hat? A circle. Watch me draw the shape. (He draws a circle somewhat like an ellipse.) What kind of motions did I use to show the height of the crown? Straight up and down motions. I will draw. (He draws.) What kind of line will show the shape and size of the rim, Mary? A much larger circle than the one for the crown. (It is well to ask some one to complete the picture.) The teacher puts on all the finishing touches that he cannot get the pupils to attempt. Other hats should now be tried. View-points should be varied. The hat should be placed on the table, on a nail in the wall, etc., and all these new situations should be drawn by the pupils, helped if need be, by the teacher, and corrected by suggestions.

Drawing from the Object Studied.—A basket full of apples placed upon a table is used for the present lesson. (1) The teacher calls attention to the striking features of the objects taken by themselves and in relation to each other. He will succeed best in this attempt by using well-directed questions. (2) As soon as he finds the pupils eager to attempt the task, he should give the word, and let them go. If well prepared by the object-observation and the questions on relations, the class will draw the table first, place the basket just where it should be, and fill it up with apples. (3) Incongruities must be corrected. (4) The "composition" must be brightened up a little just to give it life. The picture may be developed by appropriate additions. Line accuracy should be emphasized sufficiently. (5) New attempts may be introduced if the recitation period permits, or, if the case demands it, the subject may be continued into other recitations.

A Lesson in Perspective.—A crayon box will be used in the present lesson. (1) (Holding the box before her so that she sees only the end surface.) How much of the box can you see, Maude? Only one end. What is its shape? A square. (Turning to the board, he draws a square with the side to be drawn in sight.) How many faces can you see now, Mary? Two, the one you drew, and the top face. (Turning to the board, he draws the top face by first making a dot at some distance to the right or left of the upper line of the square, and then drawing the edges of the face by starting from the corners of the square toward the dot, or vision point. After that he completes the top face. He explains the converging lines of the top face by comparing it with the appearance of convergence in railroad tracks, and calls it "Perspective." (Holding the box to suit the purpose.) How many faces do you see, Mary? Three. Please draw the new side, Mary. (This is the pedagogical crisis. If the top-face was skilfully taught, it will serve as apperceptive preparation for the drawing of the new face, and Mary will complete the new face with triumph written all over her countenance.) (2) A string of boxes similarly drawn by the teacher, but adapted to his purposes in size, relative proportions, etc., must next be converted by the teacher into all sorts of well-known objects such as books, chairs, tables, etc. This process reveals the cube in perspective as a law of astonishing significance in art and nature. (3) The class must now be required to explore the world around them to find examples. Some of these must be drawn. (4) Incongruities will still occur. (5) Practice will be needed to perfect hand-control. (6) The box-like things to be drawn must be placed in all the nine possible perspective points to prevent arrest of development in drawing new things of the same sort. (7) The technical terms to be learned in connection with perspective must be gradually introduced.

The Cylinder.—A tomato can will be used in the present lesson. The student of this chapter will know why. (1) The "can" should be held before the face of some one in such position that the circular top and the curving body can be seen. It should then be drawn. If the pupil draws the invisible half of the bottom circle, he must be made to see the incongruity. (2) A whole string of cylinders, adapted to the teacher's purpose like the boxes, should be turned into well-known objects. When the composition is complete it may be a pump with water running into a bucket standing on a floor, etc. This inductive device will be far-reaching. (3) Deductive inventions should follow as practice. Light and shadow must be taught.

INTERMEDIATE MAP-DRAWING.—The free-hand map-drawing of the intermediate course is comparatively easy. (1) The first thing to do is to teach the learner how to get the details of the map into his mind in right relations. These details include the boundaries, relief, centres of population, latitude and longitude, etc. (2) If the modes of representing these have been mastered, the map-in-the-head need simply be transferred to the board. The various geographical features represented by the map should be accompanied by names.

High School Methods

In the high school, both the learner and the necessary course modify and supplement the methods of the grammar grades. Among the things to be emphasized are the following:

Technic.—The final phases of all species of drawing are highly mathematical. Symmetry, proportion, grace and repose, with other qualities of use and beauty, are the chief concerns.

Accuracy.—Both for "beauty's" sake and for the sake of "use," the tasks of high school drawing must be performed with mathematical exactitude. And this requirement of art is emphasized by the needs of adolescence. The necessity of accuracy in the high school subordinates free-hand to mechanical drawing to a large extent.

Invention.—Both the self-emancipating impulses of adolescence and the interests of livelihood emphasize invention in high school drawing. Exercises in constructing draughts, accompanied by full and exact instructions for their use in building operations, are called for. Ornamental designing should be very much encouraged.

Recitations.—The method and the spirit of the high school recitation in drawing must be very largely the method and the spirit of mathematics. (1) The assignment of tasks resembles that of problems in arithmetic, and the execution of the tasks resembles that of geometry. (2) Demonstrations will be necessary. (3) The occasional construction of tasks on the part of the teacher takes the place of former illustrations.

Value of Drawing

The subject matter of drawing, together with the necessary methods, make drawing a most valuable means in education.

As a Mental Exercise.—(1) Taught by modern teachers the drawing of the lower grades promotes imagination that conserves, defines, and extends child-life experience as it should in the epochs involved. (2) Free-hand drawing combines judgment with a muscular control that serves both the interests of culture and of life. (3) Drawing affords the pleasure which always comes with expressive language, a thing which drawing is to the highest degree. (4) By and by the better understanding which the drawing pupil gets of artistic effort leads to high appreciation of the beautiful and perfect in the arts.

Life Values.—(1) Both the expressive power and the appreciating power of the drawing-trained pupil add to his happiness. (2) The ability to draw, as a means in language, helps teachers very much in other branches. (3) Taste, judgment, muscular control, etc., are valuable means to success in the making of a livelihood.

Training of the Drawing Teacher.—(1) The drawing teacher needs a very complete course in drawing. He will need this training to enable him both to understand the pedagogy of drawing and to teach others what he knows. (2) The public schools will of course put him on the way. The Normal school and the special school must undertake the rest of his training.

The History of Drawing

The history of drawing is almost identical with the history of art and invention.

National History.—Drawing was one of the earliest languages. The hieroglyphics of the ancient Egyptians, for example, were skeleton pictures used as words. The Greeks cultivated drawing as the handmaid of beauty, and Rome valued drawing as a useful art, employing all the genius of invention in her vast engineering conquests. Modern nations gather up the purposes of all the past in drawing.

In the School Curriculum.—(1) The priestly classes of ancient Egypt and the valley of the Tigris-Euphrates emphasized drawing in their course of training. (2) The free Greek and the high born Roman found this branch in his curriculum, and became an adept in its possibilities. (3) The mediæval church high schools for boys combined instruction in drawing with instruction in geometry. (4) In the schools of modern Europe drawing has become an integral part of popular as well as higher education. The European schools of technology offer most extensive courses under most efficient teachers. (5) In the towns and cities of the United States the inclusion of drawing in the school curriculum has become the rule. (5) The rural schools still hang behind. The training of teachers and progress in civilization will soon make drawing compulsory in the rural schools.

Pedagogical Progress.—(1) Logic ruled supreme for centuries in course and method. Modern psychophysics undertakes to harmonize both the courses and the methods of instruction with genetic needs. The loss to logic is abundantly made up by gain in " life."

Supplementary Reading.

1. Educational Review, May, 1897, Oct., 1897.
2. Pedagogical Seminary, Dec., 1893, Sept., 1902, Sept., 1907.
3. Why Drawing Should Be Taught in the Public Schools. Thompson, N. E. A. Report, 1877.

CHAPTER XI

MANUAL TRAINING

The Nature of Manual Training

The subject-matter of manual training is so largely dependent on purposes, or ends in view, that these must be determined first of all.

Definition of Manual Training.—To include any study in the school curriculum simply as gymnastics, whether physical or mental, is no longer permissible. The great majority of present-day boys and girls must take up the battle of life at an early age, and woe to those who are compelled to take up bread-winning vocations without special training. Then, too, it has been proved that vocational training, except where it becomes automatic, is not necessarily an inferior cultural training. We must accordingly define manual training as *the educational use of hand-tools for life-vocations.* The materials needed for this combination-purpose will, as always, determine both the courses to be followed and the methods to be used.

The Subject of Manual Training.—(1) Physical construction presupposes planning or mental conception; somebody must " think " the thing to be made before it is made. The thought may be embodied in a " model " or expressed by means of " draughts," or " designs," as in architecture. (2) The selection of materials follows. Whether paper, clay, wood, brass, or iron, should be used, will depend on the qualities of these as means to ends. (3) Tools, like materials, must be selected as means to ends. Where the scissors, knife, gimlet, hammer, saw, or plane, will not do the file, vise, or something else may be just the thing. (4) The actual construction of the thing proposed is a psycho-physical process in which the will combines with eye-judgment to accomplish with the hand and tool whatever has been undertaken. The finished thing may be a geometrical form, a clay ball, a picture frame, etc.

The Psychology of Manual Training

The mental action to which manual training gives rise is like that of writing, drawing, or any other art.

Observation.—(1) The "model" by which the worker is to be guided may have to be measured. This will require accurate perception. The "draught" accompanied by detailed instructions will appeal powerfully to creative imagination. "Designing" is a strenuous exercise in creative conception. (2) The selection of materials and tools as means to ends in an act of judgment amounting to causal reasoning, as when we choose the half-inch augur to bore a hole for an iron bolt through oak wood.

Induction.—(1) The selection of materials and tools as means to ends leads to comparison of results, and thus becomes an inductive search after law, as when we learn to use the different kinds of saws to get results in wood. (2) Coupled with inductive search after law, is the tendency to correlate muscular control with eye-judgment until such correlation becomes perfect habit, as in clay-modelling or wood-carving.

There is a very pronounced tendency to jump at conclusions in the search after law, and a rapidly accumulating satisfaction with attained perfections in hand-work, both of which end in arrest of development unless the tendency is counteracted by the persevering introduction of the "new" into all the tasks that otherwise would seem to be "alike."

Deduction.—(1) Up to the age of fifteen or sixteen, as genetic psychology shows, the interests of mental growth require a predominance of induction over deduction. This subordination of deduction to induction into which, as suggested, the "new" is persistently introduced, prevents arrest of intellectual development and serves as a stimulus to individuality. (2) In the last two years of the high school the mechanical skill so much needed in the life to which the pupil may be destined should be developed by abundant practice in every task. In other words, " variation " should be more and more eliminated from repeated tasks in the latter years of the high school.

Physiology of Manual Training

Recent scientific investigations show that manual training is capable of grievous physiological offences.

The Eye.—The necessity of working " to a point " or " to a line " is a strain on the eye. The manual training room should therefore be properly lighted, the pupils should be rightly placed with respect to windows or sky-lights, and the tasks should not be pushed to the point of eye-fatigue.

Posture and Movements.—Eagerness to see well and to do well in working to a line or point prompts the pupil to assume back-breaking and other injurious positions, as in sawing wood, and to resort to neck-twisting, muscle-cramping and other serious movements, as in boring or knife-work. These results are extremely likely in the latter stages of manual training when the value of the finished article comes to be emphasized above the gymnastic or culture effects. Effective teaching will reduce such offence to the minimum.

Injuries from Tools.—To serve their purposes in working to a line or point, tools must be reasonably sharp. Hand-control is uncertain when the saw is dull; the result may be a waste of costly wood. Besides this the best of workers lose time with tools that do not work well. But sharp tools, such as knives, hatchets, planes, and saws are dangerous. The careless boy may hurt himself and others near him. The chemistry-room is hardly more dangerous than the manual training room in charge of inefficient teachers. Vigilance and caution will do much to prevent bad results.

Courses in Manual Training

The ends in view in manual training require an adjustment of the task first of all to the pupil but after that to life as it is to-day and will be to-morrow. Nor should the two requirements conflict with each other.

Course for Beginners.—(1) Scientific study of such instincts as sense-hunger, construction, realistic imitation, and the like, show that Nature requires the child to pass to the abstract through the concrete, and endeavors to usher the child rapidly into the constructive heritage of his race. The transition to the abstract through the concrete can be most effectively promoted through hand-work because it brings the child into experimental sense-contact with the qualities of physical environment. Its constructive appeal to the realistic impulse makes manual training the most powerful agency in the child's struggle to acquire the attainments of his race. (2) When the corrections which modern child-study finds necessary to make are made, Froebel's kindergarten exercises are admirably adapted to the purposes of manual training in the early education of the child. The child's course in manual training should accordingly consist of carefully selected exercises in block-building, modelling in sand and clay, colored needle work, laying sticks, folding and cutting paper, whittling with the knife, weaving, and the like. The drawing, writing, language, and plays which belong to this period may often be effectively correlated with this selected hand-work.

Intermediate Manual Training.—(1) Among the dominant interests of the child from ten or eleven to fourteen or fifteen years of age are constructive and social imitation, competitive and useful invention, and the like. All these, as Froebel saw long ago, are seen in mass combinations in the institutional plays to which boys and girls constantly resort. In these interests Nature is evidently proposing the many-sided rapid education of the mind in connection with the body. Much of the energy so commonly wasted through the years now in question can be saved for boys and girls alike by giving them the handwork which the case suggests. (2) Among the exercises that are best adapted to the ends in view, as clearly shown by the Swedes, are the making of the geometrical forms, the materials to be used being either paper, card-board, or wood. All the hand-tools of common life should be introduced in due time. This "sloyd" work, or skill producing work, should not completely take the place of the tasks belonging more emphatically to the grades below. On the contrary, these earlier tasks should be graded to suit, and continued as an educative agency. A year or two before the boy enters his teens he should begin to construct toys, such as spinning tops, weather-vanes, kites, etc. Presently decorative designing may be introduced in connection with coöperative and social undertakings, as in converting a room from one purpose to another. When motor control and the sense of responsibility have been sufficiently developed useful articles like comb cases, picture frames, paper weights, etc., should be introduced and pushed into prominence. The educative purpose of these tasks evidently extends to girls, but domestic tasks may be substituted for some of them when possible. The school garden, the school farm, and many-sided physical culture, are indispensable supplements of manual training. Without these additions manual training too often proves narrowly specialized and physically one sided.

Advanced Manual Training.—(1) The high school curriculum, including, as it does, such studies as physics, physiology, and mathematics, calls for a course of manual training that supports such a curriculum from the side of apparatus, illustration, and experiment. The three or four hundred highly specialized bread-winning vocations into which modern life has been split, and from which shop apprenticeship has been largely removed, call loudly upon the high school to provide a course in manual training that consists of carefully selected norm or type work. The "hand-minded" pupil, the backward pupil, the moral delinquent, and other defectives can often complete the high school course so reinforced when otherwise it must be quite impossible, and a vast multitude of boys and girls will escape the necessity of the after school and the night school in preparing for the bread-winning life. (2) The high school course should accordingly include mechanical drawing, pattern making, decorative and useful designing, the construction of apparatus, toys, useful articles, carpentry, wood-turning, wood-carving, basketry, photography, gardening, farming, and other carefully selected tasks. Even this list is only a suggestion of the vastness of the fields from which the school tasks must be chosen by a well-trained teacher. Local requirements, time, equipment, and the like, must condition the selection of the tasks to be included.

Material Equipment for Manual Training

Material equipment for manual training includes a suitable room, suitable working materials, and suitable tools.

The Room.—(1) In cities and the larger towns grade rooms or district rooms planned for the special purpose may be reserved in central buildings. This serves the interests of economy and the interests of instruction. (2) In the villages and rural districts storage-room for tools and materials may have to be found in the school room proper, and the room itself furnished with a working table may have to serve for all grades. Such a make-shift will of course reduce the possibilities of manual training, and is very much to be deplored. Where the financial resources permit it, a suitable shop or working place should evidently be secured.

Materials.—Prepared paper, card-board, splints, sand, clay, colored darning cotton, wood of various kinds, etc., should be supplied by the school, and prepared for use by the teacher.

Tools.—(1) Among the tools required in the course for beginners are scissors, knives, needles, pencils, rulers, etc. (2) Intermediate pupils need the complete outfit of the modern carpenter, and there should be enough sets to supply at least one-third of the pupils of the school at one time. This supply makes it possible to divide the grade into three sections, the sections to recite in their turn once or twice a week. (3) The high school needs the photographer's outfit, the wood-turning lathe, etc., as well as the carpenter's complete outfit.

TEACHING MANUAL TRAINING

As in other branches, the relation of the task to the learner must determine not only what shall be taught in order, but also the method to be used.

Methods with Beginners

Preparations for the coming recitation serve the best interests of study and instruction.

The Teacher's Preparations.—(1) The teacher of beginners in manual training must study the personal needs of his pupils and select the task that serves the purpose. (2) He must prepare the materials to be used and see to it that the necessary tools are on hand and in good condition. (3) All the hygienic preparations must be made. (4) Interesting and useful information must be mastered for the purposes of class instruction.

The Beginner's Preparations.—(1) The beginner in manual training may be permitted to be a partner of the teacher in preparing the materials and tools for the coming recitations. (2) Between times correlated drawing and story language work may be required of older beginners.

Recitations with Beginners.—Suppose it to be a lesson on paper folding. (1) The process should be illustrated by the teacher, and instructions should be coupled with the illustration. Respect for tools and materials should be inspired. (2) The pupil must try to do what he saw the teacher do. This imitation must be accompanied by suggestions and corrections, and the joy of success must be used as a stimulus to patient perseverance. (3) The same task must be assigned more than once, but the teacher must guard against absolute sameness of task. The "new" however little it may be should be introduced into this repetition work in order to prevent arrest of development.

Intermediate Methods

The special ends in view determine the adaptations to be made in every course.

Preparations.—The wider scope of the course requires more extensive knowledge of the tasks involved and more detailed preparations.

The Teacher's Preparations.—(1) The intermediate teacher, like the one before him, must prepare the materials to be used and see to the tools. (2) He must study the individuality of his pupils and select work to suit the special cases. (3) He must be prepared to explain materials and tools and ends in view.

The Pupil's Preparations.—(1) The intermediate pupil should be taken into more complete partnership with the teacher in the preparation of materials and tools. (2) The correlated drawing and descriptive work should be somewhat more exacting, and may at times be prepared at home. Such work should however not be allowed to encroach upon the school curriculum.

The Intermediate Recitation.—(1) The intermediate recitation in manual training should begin with instructions coupled with drawings and illustrations. Suppose it to be a wood-sawing lesson. The class should be told how to set the saw to the wood; how to draw rather than push the first stroke, and why; how to lengthen the stroke and why. Sample sawing may accompany the explanations. The selection of the wood to be used should be explained, and wood-history studied. (2) Suggestions and corrections should be coupled with the sawing. Appeal to the sense of responsibility should be coupled with the joy of worthy achievement. (3) Practice in the kind of sawing already taught is of course necessary in the interest of memory and muscular control, but something new should be introduced as often as possible to keep the process from becoming slavishly automatic.

High School Methods

The correlation of high school manual training with the rest of the curriculum, together with the world-wide area from which the exercises should be chosen, multiply responsibilities amazingly. The intellectual, moral, and practical interests involved emphasize technic, accuracy, and invention at the same time.

Technic.—The graduate in manual training should have the language of his art at his tongue's end. The adaptation of tool to material add process should be based on scientific principles. He should know both the history of his art and the place to which it points for himself in the world.

Accuracy.—Mathematical and artistic accuracy should of course be the aim in high school manual training. Such accuracy is a most effective adolescent discipline. It also serves as a training in fine muscular control. Accuracy coupled with the sense of responsibility is high training for livelihood.

Invention.—The high school graduate who is not only thoroughly at home in all he undertakes, but who, by reason of the type or norm work to which he applied himself, can turn his hand to many things is well equipped for modern opportunity. The most daring specialist will also have to be the most resourceful thinker.

High School Recitations.—(1) The high school recitation in manual training, like the lower ones, should begin with definite instructions, and these should be coupled with helpful drawings and sample work by the teacher. (2) The endeavors of the pupil should be coupled with suggestions and corrections, but to make him inventive he should be thrown more and more upon his own resources in achieving ends in view. The worth of skill acquired and work accomplished should always be coupled with the sense of responsibility. (3) The practice work which must be so much emphasized in the interest of technic and accuracy must be carefully inspected by the teacher. Accounts of achievements must be kept and credits given. All attempts to be untrue to the task in hand or the ends in view should be thoroughly corrected.

Value of Manual Training

The "hand" is wonderfully near the "head" in education, and almost absolutely necessary to the life of man on earth.

As a Mental Exercise.—(1) The perception of qualities belonging to the raw materials and tools employed is so important to mental and physical emancipation that manual training can hardly be over-estimated. (2) This result is greatly magnified by the constructive and creative imagination which manual training promotes. (3) The nice judgment which the causal reasoning from means to ends makes necessary in manual training is the best realistic preparation for the abstract flights required in the high school curriculum. (4) Manual training is a most effective complement of physical culture in the development of muscular control. (5) The use of tools on raw materials is an exact duplicate of the ordinary struggle to make a self-respecting, hopeful living.

The Life Values of Manual Training.—(1) The complex industrial life which the boys and girls of to-day and the future must face is partly robbed of its terrors by the open doors of opportunity to which manual training points the way, and by the brain-filled skill to which it leads. (2)

This brain-filled skill in the classmate who will have to work for a living will command the respect of the boy who may never have to work, and will thus help to lessen the strain between capital and labor. (3) The manual training school is turning the Red man's face away from savage warfare to the peaceful arts of his conquering white brother. (4) The Negro, freed from slavery, has long continued to abhor its mark—the forced labors of his hand—and as a consequence he often lives a shiftless and immoral life. The experiments of Booker T. Washington, the Moses of the Negro race, prove that manual training expanded into industrial skill produces a self-respecting and hopeful Negro. (5) The mentally backward pupil is often able to complete his course in school when reinforced by manual training. It is a veritable God-send to the hand-minded boy. Combined with social and civic opportunity, as in the George "Junior Republic" of New York State, manual training expanded into all sorts of industries is working veritable miracles. (6) Manual training makes the farmer work with a brain-filled hand.

Training of Teachers.—(1) Both the complexity and the importance of the tasks of manual training emphasize the necessity of trained teachers. (2) In range such training should cover a larger area than that which it may be necessary to cover in the class room. This will allow for "elbow room" and serve as "over tone" and "atmosphere." Adequate training must include both a mastery of the subject and the mastery of its pedagogy. (3) The schools of to-day will soon furnish the back-bone of the required training, but the Normal school and the technical school must supplement and perfect the work. The school teacher who perfects himself in manual training will not have to worry much about the getting of a place.

Expense of Manual Training.—Statistics show that the actual cost of manual training lessons is much less than one might at first suppose. Counting the employment of efficient teachers, the supply of materials and tools, as well as the room and furnishings, investigating committees have ascertained that the average cost of a boy's lesson is about seven cents and that of a girl about nine. Considering the services which manual training may be made to render to the rest of the school curriculum, the high gymnastic or culture value, and the immense advantages of skilled and brain-filled labor over unskilled and brain-lacking labor, as shown by statistics, the money spent for manual training is surely wisely invested.

History of Manual Training

A complete history of manual training would help to make this treatise quite too bulky for its purpose. A suggestive outline is deemed indispensable.

Russia.—"The principle of the manual training school exists in the kindergarten, and for that principle we are indebted directly to Froebel, and indirectly to Pestalozzi, Comenius, Rousseau, and Bacon. But it was reserved for Russia to solve the problem of tool-instruction by the laboratory process, and make it the foundation of a great reform in education. The initiatory step was taken in 1868 by M. Victor Della-Vos, director of the Imperial Technical School of Moscow." This Russian reformer, like his great German predecessor, hoped first of all to improve the necessary head-work of the school through correlated hand-work. For this reason the pupil is not allowed to produce "trade wholes" but only "parts." Nevertheless the secondary hope that skill in making "parts" would in due time result in making useful and marketable wholes was hardly inferior to the fundamental hope.

Sweden.—A little more than a quarter of a century ago the Swedes organized what has come to be called the "sloyd" system of manual training. The word sloyd means skilful, deft. The movement was designed to keep machinery from destroying peasant home industry during the long winter night. There is a Swedish training school in home-sloyd at Naas for teachers. Machinery is little used. Wholes rather than parts are constructed by the pupil, but the educational aim is made to dominate over the mercenary aim. Boys and girls alike are trained in woodwork with hand-tools, and the results are marvellous.

Europe.—(1) France emphasizes the industrial aspects of manual training. (2) Through such men as Goetze at Leipsic, Germany has recently begun to bring both the courses to be pursued and the methods of instruction into perfect harmony with genetic psychology and modern industrial complexity. (3) England is waking up into fierce industrial competition with France and Germany. Practically all Europe has adopted manual training in some form or other.

America.—Greatly pleased with the collection of hand-tools and samples of shop-work which he saw in Philadelphia in 1876, Dr. John D. Runkle, President of the Massachusetts Institute of Technology, recommended the system for his own institution, and thus caused the adoption of the Russian reform in America. Dr. C. M. Woodward founded the second manual training school as a department of Washington University, St. Louis, Mo. The first class was graduated in 1883. Since then university has vied with university, city with city, and state with state, in impulsive eagerness to adopt the system. "More than two-thirds of the cities of the United States having a population of 40,000 and over have adopted manual training in some grade or other of their public schools. The smaller towns and rural districts follow rather far in the rear."

DEFECTS.—The impulsive eagerness with which manual training has been adopted has permitted defects in course and method to become parts of otherwise praiseworthy reforms. (1) The framing of the courses has not been able to keep pace with the growing complexity of modern industrial development. The courses will have to continue in a state of flux for years. (2) The fascination with which efficient teaching envelops manual training has often been permitted to divorce the student from the rest of his curriculum. The correlation of the course with the other studies must be very much improved. (3) The adoption of educationally inferior exercises has too often given sore offence to the genetic needs of the student. Scientific adaptation will be necessary.

Other Lands.—Manual training has found its way to distant parts of the Orient and the islands of the ocean world. (1) The Christian missionary carries it to his converts to help them become self-supporting in the midst of hostile populations. (2) World-wide commerce carries it and the industries to which it leads wherever ships and caravans can go. The prospects are that all the world will presently be compelled to bless the name of Della-Vos with that of Froebel. The Carpenter of Nazareth is really the Master at whose feet these great reformers learned the lessons they have brought.

Supplementary Reading.

1. Educational Review, Nov., 1895.
2. Intellectual Value of Tool Work. Harris, N. E. A. Report, 1889.
3. Manual Training in the Grades. Harvey, N. E. A. Report, 1905.
4. N. E. A. Reports, 1903, 1904, 1905, 1906.
5. Manual Training and Good Citizenship. "The Elementary School Teacher," Oct., 1905.

CHAPTER XII

AGRICULTURE

The Nature of Agriculture

As a process agriculture is the cultivation of the soil with the purpose of compelling it to bear the plants we want, and through these as means the animals we want. (1) The facts of agriculture, like the facts of grammar and arithmetic, can be ascertained by observation. By comparison we learn the principles to which the cultivation of the soil must conform when we aim at best results. And so far agriculture is a science. As a science agriculture includes the chemistry of soils, the physiology and hygiene of plants and animals, together with the physics and the mathematics of the means employed in the cultivation of soils and products. (2) So far as agriculture is the physical application of principles it is an art. This aspect of agriculture has been termed "scientific farming," "scientific gardening," etc. (3) In its most essential features agriculture serves the interests of human life and happiness.

Agriculture Defined.—As just explained, *Agriculture is the cultivation of the soil and its products for the good of man.*

Agriculture, as we shall see, can be made a most valuable part of our school work.

The Subject of Agriculture

The subject-matter of agriculture, in accordance with the definition of its nature and its purpose, may be conveniently treated under plant production, animal production, farm mechanics, and farm economics.

Plant Production.—Whether we shall be able to compel the soil to bear the clover, wheat, or peach we want will depend first of all upon the soil, seed, or plant that we choose. Oftentimes the soil in question must be fertilized to suit it to the plant to be produced, to the geographical relief of the field, and even to climatic averages. The layering of plants, the grafting of trees, etc., may be necessary. In many cases weeds and pests must be destroyed. Plants like corn or potatoes must be fed with adjacent soil. Irrigation, watering, etc., may become important.

Animal Production.—Fruits, vegetables, grains, and the like are good for man directly. Other plants are cultivated directly for the sake of animals and thus for man indirectly. This is largely true, for example, of the grasses, corn, etc. Among the animals to whose profitable production agriculture is physiologically adapted are poultry, pigs, sheep, cows, horses, etc. Bees should also be included in the list. (1) The problems of scientific, and thus profitable poultry raising, are many. The venture must begin with the selection of a locality physiologically suited to the purpose, and the selection of superior stock. The food must be hygienic both in quality and quantity. Much will depend on sanitary housing. Pests and diseases must be combated scientifically. The hatching process must be scientifically supervised. (2) The farmer who hopes to make "pigs pay" must select superior stock to begin with. Scientific accuracy of diet and a sanitary sty are both of great importance. The diseases to which pigs are subject must be studied and combated. (3) Cows can be made a very profitable asset of agriculture. The stock for the venture should, of course, be the best in the market. Sanitary stabling is of great importance. Accurate diet, including wholesome pasture, is an absolute necessity. The utmost care should be exercised to guard the herd against the dangerous diseases to which cattle are subject. (4) The farmer who happens to own pasture land which he cannot convert into profitable arable fields, can make sheep-raising profitable. Superior stock, a sanitary fold, freedom from pests, etc., are the great necessities. (5) On the big farm horse-breeding can be made profitable. The venture must, of course, begin with superior stock selected for a special purpose. Hygienic diet and sanitary stabling are of great importance. Exercise is essential. Medicine and surgery may become important. Mistakes in the "breaking in" process may be very serious. Expert help is profitable. Hygienic diet and sanitary stabling for the horse always pay. Force, overwork, cruelty, etc., never pay. (6) The aviary may be made to pay the farmer. His clover and other crops will furnish all the food. The hive must of course be suitably located and properly superintended.

Farm Mechanics.—Plant production and animal production require the employment of mechanical means. Among these means are spades and hoes, rakes and forks, harrows and plows, planters and cultivators, mowers and reapers, hoists and threshers, cutters and windmills, churns and scales, harness and wagons. The uses to which these means are to be put, together with the proper care and repair of the same, must be learned most thoroughly. It serves the purposes of profitable agriculture to know the mechanics of water supply, sanitation, irrigation, plumbing, steam-fitting, horse-shoeing, road-building, saw-milling, etc.

Farm Economics.—(1) The production of certain plants or crops may not pay. The necessary tools and machinery, together with the fertilizers, pest-destroyers, etc., may make the production in question unprofitable. "Truck farming" may pay the "small farmer," or the farmer near the town, better than the ordinary farm crops. The farmer who hopes to succeed financially must know how to determine these things by arithmetic. He must learn by experiment and from books how to "stop leaks" and how to get improved results. Perhaps the soil or climate is unsuitable by nature. Perhaps there are fertilizers to be found that will remedy the defects. Perhaps the culture-processes are unscientific. (2) Animal production must of course be subjected to the same sort of tests. The production of poultry, bees, cattle, horses, sheep, etc., may cost more than the products will be worth in the market. The "flora" and climate of the locality may be better suited to sheep raising than cattle raising. The market-demand for poultry may be greater than the demand for pork, cheese, etc. Perhaps the stock, food, feeding, housing, etc., may be wrong. Perhaps the milk, butter, eggs, meat, lard, honey, cheese, wool, etc., could be more temptingly and more hygienically prepared for the market. Leaks in service, supervision, etc., may have to be stopped. (3) The necessity and value of machinery and implements must be determined. It may not pay the small farmer to own a self-binder for his harvest, but a "cutter" for his fodder may be just the thing. It will pay the large farmer—especially where hands are scarce and labor high—to own the gasoline engine, the corn-planter, etc., better than to do without these conveniences. In many localities training in the mechanics of carpentry, horse-shoeing, shoe-making, water-supply, irrigation, road-building, plumbing, etc., are a veritable Godsend to the farmer. A knowledge of domestic science, including cooking, baking, laundry work, etc., in the farmer's home will not only pay in dollars and cents but in happiness.

The Psychology of Agriculture

The scientific study of agriculture is particularly rich in necessary mental action. This is a consequence of the scope of agriculture and the physical and vital forces coming into view within this scope, as just set forth in the explanation of the subject.

Observation.—(1) Plant production and animal production take "time." The observation of both must therefore always consist of many observations so timed as to show cause and effect in correct relations. The facts of growth, arrest of growth, rapid growth, abnormal growth, etc., may depend on native soil, on fertilizers, weather, food, pests, etc. These things must of course be taken into consideration in the ascertainment of the real facts. The mental action thus involved is rich in exact perceptions, faithful memory, cautious judgment, vigorous attention, etc. Besides all this the obvious relation of agriculture to the life we live crowds the necessary observations with intensest interests. (2) The mental action to which ordinary agricultural observation gives rise is intensified and improved by the purposeful introduction of modifications into plant production and animal production. The agricultural "laboratory" produces as rich and complex a correlation of observing faculties as experimental biology, to which of course it is really "next-door."

Induction.—As explained, a multitude of result-modifying agencies may enter into plant and animal productions. The danger of jumping at conclusions in agricultural induction is therefore very great. False conclusions in agricultural induction have serious practical consequences. The prevention of such results through "laboratory revision" of conclusions is therefore simply imperative, but, as we shall see, it makes the scientific study of agriculture a most powerful instrument of education in the hands of a trained teacher.

Deduction.—Agricultural deduction must of course follow induction. The principles of chemistry, physiology, hygiene, mechanics, economics, etc., must be applied. In that event traditional practices in agriculture will give way at last to resourceful and experimental agriculture. The mental action of which such deduction must consist requires intelligence of a high order, but should not be impossible for those who put forth honest effort.

TEACHING AGRICULTURE

The nature of the mental action for which the subject-matter of agriculture calls determines at the same time both the courses and the methods of instruction.

Courses of Agriculture

There should be nothing haphazard in the courses which the modern school attempts. (1) The stuff to be included in a course of instruction should be made to correspond correctly with the mental readiness of the learner. The readiness in question should be one of ripeness both in interest and in ability. (2) Apperception should determine the sequence of the lessons in the course. (3) Local limitations and local destination, including illustrative riches or poverty and laboratory facilities or the lack of these, should be allowed to modify the genetic construction of the course and also the daily undertakings.

Course for Beginners.—In the years just before the child begins to go to school he acquires much valuable knowledge through the spontaneous nature-study of birds, insects, flowers, trees, etc., as he finds these in his immediate environment. To be true to genetic dictates, the course of agriculture for beginners should therefore be, up to the age of about twelve, a somewhat apperceptive and unbroken continuation of this spontaneous nature-study. (1) For the first few years, both the boys and the girls should observe "wild and cultivated plants, trees, insects, and animals right around their home, on the way to school, and round about the school." They should also "plant and grow some of the common hardy vegetables, such as radishes, lettuce, beets, and carrots; and one or two quick-growing flowers, such as dwarf-nasturtiums." (2) The subgrammar grades should "observe weather, soils, wild and cultivated plants, trees, insects, and animals" as found in the school district and the township. They should "compare the habits of plants and animals in order to become familiar with their different modes of living, their struggles for existence, and their uses to man." They should also "plant and grow typical economic plants of the region, giving some attention to different varieties, and to the relation of crops to different conditions of soil, weather, treatment, etc." First outlined in 1906 by Professor B. M. Davis, this course is not only genetically suitable but educationally very necessary.

Grammar School Course in Agriculture.—The mental development of the grammar grades calls for a wider course of observations supplemented by comparisons and applications that will serve both the purposes of education and the ordinary needs of the farm or garden. (1) The pupils of the grammar grades should record the weather-history of a reasonable number of plant-productions to discover weather-effects. They should compare the crops of the farms in the school districts to ascertain the effects of soils and fertilizers, difference of seed-times and crop-rotations, difference in modes of sowing, planting, cultivation, etc. Their attention should be called to the poultry, cattle, horses, etc., on the farms of the school district, in connection with the kind of food, feeding, housing, sanitation, etc., to which the animals in question have been treated. (2) During the last two years of the grammar school the better farms of neighboring districts should be visited to study farm-animals, irrigation and drainage systems, home water supply and sewage systems, buildings and fences, orchards and spraying machinery, rotations and other systems of cropping. "The pupils should be taken to local dairies to study dairy animals and machinery; to creameries, cheese factories, and canneries to study methods of preparing products for consumption and shipment; to cold-storage plants to study the preservation of foodstuffs; to the butcher shop to study meat cutting; to the green grocer to study methods of preparing fruit and farm products for market; and to the implement dealer to compare types of farm machinery." (3) The grammar school course in agriculture should include a good deal of school garden and home garden work. The pupils should "plant and grow different varieties of crops—*e.g.,* wheat, barley, sugar, beets, potatoes. Exercises in pruning, grafting, making cuttings, etc., should be introduced. The pupils should be encouraged to grow crops, poultry and farm animals at home. They should be taught how to keep account of labor, fertilizers, feed, gross and net returns. They should experiment on different methods of planting, cultivating, harvesting, and preparing for market." (4) These experiments should be accompanied by laboratory experiments in the chemistry of soils, plant-life, sprays, etc.

High School Course in Agriculture.—The greater maturity of the high school pupil, coupled with the vast opportunities for livelihood and prosperity which scientific agriculture offers to the youths of our land, calls for a very complete course in agriculture. The township high school that does not help by such a course to make rural life attractive, dignified, and profitable misses the modern mark by a great deal. The same lessons reverently taught in town and city high schools will relieve the overcrowded shop and factory, and make the overcrowded tenement a thing of the past. (1) The course should follow the lines already suggested for the grammar school, but it should be widened and deepened. (2) It should include a thorough course in agricultural chemistry, botany, zoology, mechanics, economics, etc., together with domestic chemistry, including cooking, etc. The course should never ignore local conditions and requirements.

Methods of Teaching Agriculture

The subject to be studied, together with the mental action to which the subject in question should give rise, determines the methods of instruction in agriculture as in other branches.

Methods with Beginners.—As in other studies, so in agriculture, preparations must be made for recitations and the recitations must be so conducted as to cause the mental action most desired.

PREPARATIONS.—(1) The teacher of beginners in agriculture should be very full of the subject which he hopes to bring to the attention of the class. He must prepare himself to direct the school garden exercises which he hopes to make a part of the Nature observations. (2) The children themselves should be encouraged to make observations along the particular lines of plant life or animal life to be taken up in the coming recitation.

Recitations for Beginners.—(1) The observation lessons, as explained under " Nature Study," should be rather informal, coming now in connection with one branch of study and now in connection with another, as geography, language, arithmetic, etc. (2) For the school-garden lessons, which may come several times a week for ten or fifteen minutes at a time, each pupil should have a school garden of his own. The plot need not be more than 8 by 12 feet. Here he should plant, cultivate, observe, etc., partly as directed by the teacher, partly as he chooses. The pupil should be made to understand that he will be allowed to dispose of his ripened garden products very much as he may choose. He may market his beets, present his flowers to his friends, etc. This permission will serve as a powerful stimulus to a faithful and delightful gardening. (3) The school should also have a " demonstration plat " on which illustrative work can be done by the teacher. The work must of course be coupled with the best possible explanations. The U. S. Bureau of Agriculture, Washington, D. C., offers to furnish school-packages of seeds for school-garden experiments.

Grammar School Methods in Agriculture.—The great variety of subjects to be undertaken, together with the multitude of details that connect themselves with almost any subject of agriculture, make painstaking preparations for the recitation very necessary.

Preparations.—(1) The grammar school study of agriculture should be more or less systematic. It may be made so most conveniently by the use of an up-to-date text-book. In order to give life and meaning to this book-course it must be coupled with local observations, district visits, school gardens, laboratory, and reference books. The teacher must study the text to be recited, and prepare himself to direct the local observations, district visits, gardening, etc. (2) The pupil must prepare the text-book lesson as he would any other lesson. He must make local observations as directed, prepare himself as required for district visits, garden work, and experiments, and consult reference books, farm bulletins, farm journals, etc.

Grammar School Recitations in Agriculture.—(1) The text-book recitation should have the usual objects of a recitation in view; it should of course consist partly of board-work and partly of oral work. Local maps, diagrams, and drawing, will often be necessary. (2) A part of the dinner hour or another convenient time should be selected for local observation lessons. On these occasions the teacher should conduct the class to the particular locality to be visited, ask the owner of the place for such privileges as may be desired, and proceed to direct the study of the things in question. The visits should be pleasant, but orderly, and the time consumed should not be too much, nor should the visits come too often. (3) The district visits, requiring longer time and special preparations, should probably be deferred to free Saturdays, holidays, etc. Visits for which the pupils are required to pay should be undertaken only by the consent of those who must pay. The pupils should not be permitted to take dangerous risks. (4) A school garden 10 by 20 feet should be assigned to each pupil. The garden undertakings should cover a wide range and require both inductive search after cause and effect, and deductive judgment in the use of text-book theories. The pupil should be allowed to market his products, exhibit at clean Agricultural Fairs for prizes, etc. Home gardens should be encouraged. Clubs should be formed for discussion of agricultural questions. (5) The teacher should make the pupils his assistants in the laboratory experiments. This will make them more observant, and serve at the same time as a needed stimulus to study.

Every experiment should help to illumine the text-book course, and drive the class to cyclopædias, bulletins, etc. Full directions for laboratory experiments should accompany the chapter of the book to which the experiments belong. Several of the Agricultural Colleges have published bulletins containing full directions for a large number of valuable experiments. The teacher may become the possessor of such helps by writing to Purdue University, Lafayette, Indiana; the Ohio State Agricultural College; the U. S. Office of Experiment Stations, Washington, D. C., etc. (6) The grammar school class in agriculture should be required to acquaint themselves with the best literature on the subject, and those who hope to make farming their occupation should be encouraged to acquire a library of agriculture.

High School Methods in Agriculture.—(1) High school purposes should shape both the preparations for the recitation, and the recitation itself. (2) The local observations, the district visits, the garden experiments, the laboratory, the mechanics, etc., of the course should therefore be coupled with strictly scientific and technical instruction. "As far as the training of the pupils in mathematics will permit, the results obtained in the laboratory exercises should be translated to field conditions, and the importance of the principles involved should be brought out by questions concerning their application to the practical operations of farming."

Value of School Agriculture

The value of a thorough course in school agriculture can hardly be overestimated.

School Values.—(1) As pointed out in the psychology of scientific agriculture, the study of agriculture may be so pursued as to require the most exact perceptions and conclusions, coupled with faithful memory, vigorous attention, intense interest, etc. (2) The study of agriculture may be so coupled with language, arithmetic, geography, physics, etc., as to furnish these with illustrative material of very high educational value.

Life.—(1) Agriculture in the rural school will serve as a stimulus to scientific farming. The scientific farmer will succeed better in plant production, animal production, farm mechanics, and farm economics. His products will bring him better prices. He will therefore have more money for education, comfort, travel, etc. This kind of a farmer will not be ashamed of his vocation, his home will not be dull and unattractive, and the city cannot lure him and his loved ones from his paradise. (2) Agriculture in the city school will lead many young people to take up life in the country, where they may win a home far away from the din and the strife. With the "letter-box" near his door, the telephone in his house, and the trolley car at his beck, the scientific farmer is a king, his wife a queen, and his children are his happy heirs. (3) The desertion of the country for the town will cease only when the city school conspires with the country school to teach boys and girls the greatness of the possibilities of country life. (4) The agricultural and industrial schools of the South will in time emancipate the Negro from a civic and moral slavery almost worse than his first estate. The far-off West will blossom like a rose when the scientific farmer goes there to live.

The Training of Teachers.—(1) The value of agricultural education makes trained teachers very necessary. (2) The agricultural colleges, equipped as they are for plant production, animal production, agricultural laboratories, agricultural experts, etc., are best prepared to give that training in agriculture which teachers of agriculture in Normal schools may need. And, until the Normal schools themselves undertake to prepare their graduates to teach agriculture in the common schools, the agricultural colleges should, for State reasons, offer a course in the pedagogy of agriculture. (3) For State reasons, as well as educational and vocational reasons, the Normal schools should teach agriculture. And they can. The delightful burden should fall in part on the teacher of biology, in part on the teachers of physics, mathematics, and geography, and in part on the teacher of methods. (4) The time is probably not far distant when the teacher applying for a position must give the same evidence of fitness in agriculture as the law requires in geography and history.

The Financial Problem.—(1) Agriculture in the public schools requires trained teachers, school gardens, an experiment laboratory, books, etc. The State appropriations to the schools may therefore have to be slightly increased. (2) The following estimate is quoted from Crospy's "Progress in Agricultural Education, 1906." "The materials to be used in laboratory work may be expensive or they may be had for a few dollars. Two dozen empty tomato cans, three or four lard pails, a few baking-powder cans and covers, a lot of empty bottles, a few small wooden boxes, a collection of typical soils (clay, sand, loam, and muck or peat), and a few seeds of garden and farm crops will enable the teacher and pupils to perform a variety of experiments, illustrating important principles upon which the science and practice of agriculture are based, and will not cost a cent. If to this material the school board or the pupils will add by purchase at prices approximately as given, an 8-ounce glass graduate (10 cents), 4 dairy thermometers (60 cents), 6 student lamp chimneys (90 cents), 12 5-inch test tubes, 100 5-inch filter papers (15 cents), a pint glass funnel (10 cents), a 4-bottle Babcock milk tester with test bottles, pipette, acid measure and acid ($5), an alcohol lamp (25 cents), a kitchen scale with dial which will weigh from 1 ounce to 24 pounds (90 cents), 12 ordinary glass tumblers (30 to 50 cents), a small quantity of litmus paper, and a few ordinary plates, iron spoons, pie tins, etc., the school will be provided with an excellent equipment for laboratory exercises, and all at a cost less than $10."

"With this material in the hands of the pupils and a teacher willing to experiment and learn with the pupils the ordinary rural school-room becomes a laboratory in which it is possible to determine the comparative temperature, weight, acidity, porosity, capillarity, and fertility of different soils; to test their water-holding capacity and the readiness with which they may be drained, and to show the effects of cultivation, mulching, and puddling on the moisture content and physical condition of different soils."

Considering the educational and vocational values of school agriculture, the expense involved should not be a serious obstacle.

The History of School Agriculture

In civilization as a process of development the pastoral stage is followed by the agricultural stage. In the agricultural stage of civilization the home becomes a fixed locality and the other institutions of civilization take on organic form. As long as the population of a country is able to supply itself with foodstuffs without embarrassment the cultivation of the soil is left to those who find it difficult to succeed in other vocations. When the sum total of the foodstuffs imported by any country begins to be greater than that of its exports, waste processes must be stopped and improved farming inaugurated. It is then that the government of the country in question finds it prudent to establish Agricultural Bureaus, Agricultural Experiment Stations, Agricultural Colleges, etc.

School Agriculture.—Europe reached this crisis first. As a result agriculture has become an integral part of the popular school curriculum of practically all European states. Improved agriculture has become necessary in all civilized countries. The government of the United States, together with many states of the Union, have taken up the matter very much in earnest.

Educational Agriculture.—Within the last ten years educators began to realize that agriculture should become an integral part of the school curriculum for educational as well as vocational reasons. At this writing a great number of the higher institutions of learning, together with the State Colleges, Technological Schools, Normal Schools, etc., offer courses in agriculture. In a number of states school agriculture has become mandatory in the grades. In other states Farmers' Institutes, Agricultural Clubs, etc., are bringing the matter to public attention. In 1906 the department of superintendence of the National Educational Association adopted resolutions urging the Normal Schools to include agriculture in their course, and requesting Congress to make appropriations to the States for the purpose. State Superintendents, County superintendents, and educators of all sorts are urging the introduction of agriculture into city schools as well as country schools, and that such courses should be offered not only to the boys but the girls. Through all these agitations, and especially because of the high values which actual experiment has demonstrated, agriculture will no doubt soon become as much a part of the public school curriculum as the branches now included.

The following valuable publications of the United States Bureau of Education are recommended to teachers:

1. Teaching Agriculture in the Schools of France and Belgium.
2. Instruction in Agriculture in Prussia and France.
3. Advancement and Improvement of Agriculture in Europe.
4. Consular Reports on Education.
5. The Curriculum of the Land-Grant Colleges.
6. General Laws Relating to Agricultural and Mechanical Land-Grant Colleges.
7. The Study of Agriculture and Metallurgy.
8. Agriculture and Mechanical Colleges.
9. Agricultural Education Including Nature Study and School Gardens.
10. On the Training of Persons to Teach Agriculture in the Public Schools.

The Year Book of the Department of Agriculture, 1907, contains a valuable article by Dick J. Crosby, entitled, "Training Courses for Teachers of Agriculture."

CHAPTER XIII

PHYSIOLOGY

Nature

As explained, the subject matter of a study determines the mental action, and therefore the method of teaching.

The Subject of Physiology.—As the science of the functions of the organs of the body, physiology includes anatomy and hygiene. In this larger sense the study of the body is one of the largest and most complicated subjects ever undertaken in the sciences. Among the things that astonish and well-nigh paralyze the exact student of physiology are, (1) the almost infinite number of organs, (2) the minuteness of many, (3) the complexity of functional relations, (4) the countless multitude of hygienic causes, laws, and conditions.

Selection of Subject Matter.—Considering the largeness and complexity of the subject, it becomes evident that in the study of physiology, when pressed for time or controlled by special purposes, we must select the more significant in preference to the less significant.

THE SIGNIFICANCE OF SUBJECTS.—(1) Some subjects in the study of physiology are more significant than others to boys and girls at school just because they are at school, as food, rest, exercise, posture, the care of the eye, the ear, etc., on account of the bearing of these things on study, growth, happiness, etc. (2) Some subjects are more significant than others because of their bearing on the future welfare of the students, as the right things to do in case of emergencies like bleeding, burning, poisoning, and drowning, or the final effects of apparently harmless things like cigarettes, exposure to germs, etc. (3) The teacher's resources in the task of causing the pupil to study what he hopes to assign must of course also be taken into consideration. It is important, for example, that the subjects taken up with younger pupils should be interesting in themselves, and that the importance of subjects taken up with older pupils can be made sufficiently evident to them.

The Shortness of Time.—Although the simpler, more interesting and useful subjects should be taken up even before the child comes to school, as opportunity may offer, the time for the proper study of the many things that are really significant is very short. The great majority of boys and girls, coming, as they do, from the humbler walks of life, do not remain in school longer than the law requires, approximately for most states at the age of sixteen. What such boys and girls do not know in physiology when they leave school will usually have to be acquired, if acquired at all, by hard experience, and the consequences oftentimes extend to those for whom they become responsible. These considerations make thorough sifting in the selection of the really significant subjects of physiology startlingly imperative.

Courses in Physiology.—The following courses for the public schools and the teachers are based on the principles set forth above.

Public Schools.—Among the things which boys and girls should know in physiology when they leave school at the age of sixteen or eighteen years are, (1) the name and location of the bones and important muscles, together with their significant character, function, and hygiene; (2) the name and location of the vital organs, such as the heart, lungs, and alimentary canal, together with their significant character, functions, and hygiene, special attention to be given to mastication, deglutition, assimilation, elimination, respiration, and circulation; (3) the name and location of the significant parts in the lymphatic system, together with the significant character, function, and hygiene of this system; (4) the significant character, function, and hygiene of the skin, nails, hair, and teeth, together with the necessary descriptive language; (5) the significant character, functions, and hygiene of the special senses, together with the necessary descriptive language; (6) the significant character, function, and hygiene of the mouth and throat, including the tongue, pharynx, and larynx, together with the necessary explanatory language; (7) what constitutes proper clothing, food, drink, air, cleanliness, exercise, rest, and sleep; (8) why, on the whole and in the long run, the use of opium, tobacco, cigarettes, and intoxicating drinks is so serious; (9) what to do in cases of such emergencies as poisoning, bleeding, burning, drowning, and exposure to contagious diseases; (10) why certain habits of dress, posture, etc., are so serious to life, growth, health, strength, and beauty; (11) etc. Though not to be put into the hands of the pupil too soon, an up-to-date text-book will serve the teacher as a guide.

TEACHERS.—While all teachers should know all the physiology they can possibly master in the interests of a most responsible profession, (1) the physiology teacher should know the subject extensively and exactly, lest he may do more harm than good, first by false instruction, then by stress on things less significant, and thus finally by bringing the subject into ill repute. (2) There is probably no subject in the teaching of which safe reasoning depends so much on large experience and wide observation coupled with special training. (3) Nor is it enough that the physiology teacher knows his subject. The sum total of his efficiency will depend largely upon his mastery of the special pedagogy of the subject, as we shall soon see.

TEACHING PHYSIOLOGY

The psychological and economic adaptations required by the subject-matter of physiology are as follows:

Psychological Adaptations.—Each one of the formal steps of physiology has its own special difficulties.

Observation.—As in all good teaching, the ascertainment of physiological facts must be based on illustrations. Statistics, however, tend to show that in teaching young children the significant facts about bones, nerves, eyes, hearts, etc., we should not be too realistic in illustrations, as when we try to show the brittleness of bone by putting it into fire or its animal matter by subjecting it to acids and then tying it into a knot, or when we dissect the eyes and heart of a butchered ox to illustrate the parts of the corresponding human organs, because, before the child can appreciate the sacredness of life, he is tempted to try similar experiments on his little friends or on pets, thus not only doing harm in the first instances but developing a somewhat natural tendency in many children into the habit of downright heartlessness. Pictorial representations coupled with vivid description, or manikins, if they can be had, coupled with explanations, should therefore be substituted for realistic illustrations until, say in the grammar grades, when respect for the sacredness of life shall have been somewhat developed. In the high school those facts which cannot be based on authentic outside observations should be taught through realistic experiments.

Induction.—In physiology the relation of cause and effect is often very remote, as in the cigarette habit, arterial degeneration through habitual strain of the heart, etc. Then again, it is very difficult to ascertain a genus or a law unerringly in physiology because the combination of conditions under which a cause, as smoking, indiscretions in diet, jumping rope, or running up stairs, vary so much in different persons. The inductive conclusions of physiology should therefore be supported by numerous examples of the rule to be proved, and the readiness to revise conclusions on securing fuller evidence should be highly cultivated, as when we find that it is dangerous after all to come in contact with the poison ivy or contagious disease.

Deduction.—There is in physiology the personal temptation of classifying ourselves or others for whom we may be responsible in a genus or under a law to which by reason of the personal combination of differences the individual does not belong, as when we subject all persons to the same diet, exercise, sleeping hours, etc. The danger of erring in such deductions should be fully explained, and the tendency if present should be effectively curbed by confutation, persuasive if possible, forcible if necessary.

Economic Adaptations.—The preparations for the recitation in physiology, and the course which the recitation itself should take, are subject to the usual requirements.

Preparations.—(1) While the lessons, whether they are to be recited daily or less frequently, as the case may permit, should be assigned in strict accordance with the present, future, and special needs of the pupil, the thread of the lessons should of course be as apperceptive as possible. It goes almost without saying that the teacher should know the lesson in all its connections. Charts, books, manikins, cyclopædias, etc., should be used in connection with supplies of illustrative materials in these preparations. (2) While almost no book preparation should be required of the younger pupils, advanced pupils should be required to make preparations similar to those of the teacher. As in other studies, the pupil's preparations not only employ the pupil profitably between recitations but they make the recitation itself a larger opportunity.

Course of the Recitation.—(1) Except as supplementary reading, books have no place in a physiology recitation. Their use in class spoils the pupil and the teacher by encouraging dependence. (2) The subject requires the same kind of board work and oral work combined with illustrative instruction on the part of the teacher and explanatory work on the part of the pupils as most other studies.

Value of Physiology

Both the knowledge and the culture acquired in the study of physiology serve the purposes of education.

The Knowledge Value.—(1) He who knows the significant character, functions, and hygiene of the significant organs of his body, will often, perhaps habitually and freely, choose to sacrifice possible present good for future and higher good, and thus add immensely to physical health, strength, skill, and beauty. (2) With these desirable possessions, as explained, come greater possibilities for piety, goodness, service, and happiness.

Value of the Process.—(1) Properly taught the physiology student finds, as already explained, that in the realm of his body and the realm of mental dependence on the body, effects are frequently long deferred and that the final effects of causes are frequently startlingly different from first effects. This impressive character of induction in physiology serves as warning to the reckless and as hope to the discouraged. (2) The difficulty of reaching generic conclusions unerringly in physiology, and of classifying special cases under rules unerringly, because of great variation in personal conditions, as already explained, makes the proper study of physiology a very valuable training in scientific and practical caution.

History of Physiology

The purpose of this treatise forbids complete inquiry into the history of physiology. In such an inquiry we should have to go back as far at least as Hippocrates, and, coming up toward the present, we should have to go into the triumphs and failures of a great multitude of scientific investigators and practitioners.

Physiology in the Public Schools.—The introduction of the study of physiology into the curriculum of the public schools was long and violently opposed in many places.

Sometimes prejudice was based on tradition, sometimes on economy, sometimes on grounds of modesty, sometimes on the supposed uselessness of the study to the masses, and sometimes on the assumed inefficiency of teachers. Finally, and largely through the Women's Christian Temperance Union and its supporters, the study of physiology became compulsory in many states. Enforced as it now is by withholding state appropriations from districts not true to the law, redeemed through "free text-books" from being a financial burden, and popularized by the professional training of teachers and the removal of other prejudices, physiology promises fair to become one of the most effective educational means in our public schools.

Supplementary Reading

1. N. E. A. Reports, 1869.
2. Scientific Temperance Instruction in the Public Schools. Foster, N. E. A. Report, 1886.
3. School Hygiene. Pedagogical Seminary, June, 1906.

CHAPTER XIV

SINGING

The Nature of Singing

SINGING, like poetry, is the language of the heart rather than the language of the head, but the vocal flights of song are more complex than measured verse. On the wings of melody and harmony the singer's "oversoul" may knock at Heaven's gate while the poet waits respectfully below. For lack of words the poet may never completely express himself, but the singer is more free; he goes on telling out his inmost soul by means of tones that mean much more than words.

Definition.—Singing may be defined as *the tuneful vocal expression of the beautiful emotions,* but unless we know beforehand just what singing is, the definition is a sorry failure. To begin with, singing is the vocal expression of emotions. This vocal expression of emotions must be tuneful or melodious. In other words, it must consist of beauty-tones flying or flowing upward, downward, onward, and in rhythmic swing. The thing to be expressed must be some beautiful emotion seeking, hoping, struggling to express itself as it could not do in any other way. Joy, love, strong desire, faith, hope, and peace—these are in the singer's heart. Even grief may sing, but despair and hatred have no wings for the flight of song.

The Subject of Singing

The materials of singing regarded as the tuneful expression of emotions consist of tones, the notation of tones, and reading.

Vocal Tones.—The tones of singing rise and fall; they swing along in measured beats; the voice is freighted with emotion; other voices may break forth in harmony. Accordingly the phases of expression here in question have been labelled scale, time and melody, voice and harmony.

Scale.—(1) A musical scale is a graded system of sounds. (2) The octave, consisting of eight definite and standard tones, is the most modern scale. In modern Teutonic music two chief forms of scale are used, the major and the minor, the latter having three varieties. (3) The major scale progresses by major or whole tones with two exceptions, the steps or intervals between the third and fourth and the seventh and eighth tones. (4) The minor scales begin a half-tone, three half-tones, etc., below the major keys. (5) Both major and minor scales are diatonic, *i.e.,* not omitting any tone in the scale. (6) A scale in which all the longer steps of a diatonic movement are divided—usually into half-tones—is known as a chromatic scale. (7) The key of a scale is a standard tone-pitch or tone-degree with which the scale movement begins and to which all the modulations are referred, as " C natural." There are about nine keys or tone-foundations in common use, namely, C natural, four keys giving rise to flats, and four to sharps.

Time.—(1) A tone may be sustained for a longer or a shorter time. This is known as tone-time. Tone-time is measured by pulse or beat. The " quarter note," for example, denotes a tone sustained as long as it takes to say " one " in ordinary conversation, and this tone may be accepted as the standard tone-time. (2) The measured swing which a succession of tones with accents at regular intervals acquires is known as rhythm. The succession of tones which forms a unit with a rhythmic accent as its basis is known as tune-time or measure, as when we speak of " three-fourth time."

Melody.—A rhythmic succession of single tones ranging up and down the scale more or less, and pleasing to the ear, is known as melody, or tune. The phrasing of a melody is like analysis in grammar, both attempting to exhibit parts or portions which are quite distinct and yet conjoined. A solo is a melody without support.

HARMONY.—(1) Simultaneous tones that please the ear, like bouquets made up of color complements, constitute what is known as harmony in music. (2) One pulse of simultaneous tones in harmony is called a chord, as do, mi, sol, do in the major scale. Chord may follow chord in harmony as wave follows wave. Successions of two, three, and four toned chords are called respectively duet, trio, and quartette. Higher combinations are possible, of course. A lower tone on the same octave with the tune-carrying "air," or theme-freighted succession of single tones, and supporting the theme thus carried is known as alto. The theme-supporting tone belonging to the octave just below is tenor, and the lower theme-supporting tone of this octave is the bass.

VOICE.—(1) The voice is the tone produced by means of the vocal organs. (2) It may be soprano, alto, tenor, or bass by natural pitch. (3) In the language of effects, the voice may be light or heavy, smooth or rough, soft or loud, firm or weak, dull or ringing, indistinct or distinct, etc.

Tone Notation.—(1) Tones, including all the details of scale, time, melody, harmony, and voice may be represented to the eye; this is known as tone-notation. It is to singing what the written or the printed page must ever be to ordinary speech. Systems of tone-notation vary very greatly as to details, but there is very little variation in the outline or the skeleton employed. This consists of five parallel lines in a horizontal plane and equally distant from each other, with convenient space between them, and the whole contrivance has been called the "staff." (2) As to details the lines and spaces represent the scale relations of tones. Short additional lines, known as leger lines, must often be employed to represent a wider range of tones. The pitch or scale relation of a tone is expressed on the staff by means of figures, letters, and the well-known sol-fa names. Tone-time is expressed by means of characters called notes, all of these too familiar to require full description in a book on pedagogy. The same thing should be true of clefs, time fractions, rhythmic bars, and a host of other symbols serving as directions for the voice.

Reading.—Tone-thinking and tone-expression according to staff directions has long been known as "reading," and the term thus used is equivalent to singing guided by the eye. Intelligent reading presupposes thorough mastery of staff mechanics, tone-imagination, and voice culture.

The Psychology of Singing

The mental action in singing resembles that of writing, drawing, and other arts in which one sense must be closely correlated with another in controlling certain muscles.

Observation.—In singing and learning to sing we have to do with two kinds of facts, namely, tone facts and notation facts.

TONE FACTS.—The sense of hearing is the special organ of perception in singing. All the facts of scale, time, melody, etc., must manifestly be learned through the ear. In the imitation of a given tone memory and judgment must conspire with the will. To be eloquent in singing, as in ordinary speech, the beautiful emotions must be present with intensity. We must sing "with feeling"; the "heart" must be in the voice.

NOTATION FACTS.—(1) The meaning of the staff in all its details can be learned in only one way, and that is by simultaneous eye-association with the facts of tone for which the details of the staff are made to stand. (2) The presentation of a symbol to the eye must of course be coupled with explanation, and this will bring judgment, reasoning, imagination, and memory to the strong support of the ear-eye-perception.

Induction.—As a convention the staff at once by a sort of forced induction, somewhat equivalent to simple memory, becomes a rule or law. By means of more and more complete explanation the staff as a rule or law should be made to mean more and more to the singer.

HABIT BUILDING.—Modes of tone production, like any other mode of nervo-muscular activity, have a tendency to grow into habit long before corrective exercise perfects them. This arrest at stages where one ought to move much further on is more or less inevitable unless the necessary corrective exercise is faithfully undertaken.

Deduction.—The translation of the staff notation into song is a deductive process that may be as simple as the recognition of a name, while in complex composition it involves most daring flights of tone imagination, strong emotion, taste that fails not, faultless courage.

HABIT.—The singer who is freely faithful, absolutely loyal to the habits that are best, finds happiness in his art.

The Physiology of Singing

The work which the ear, the eye, and the organs of speech perform in singing is quite important to the process as a whole.

The Ear.—As already indicated, it is through the ear that we judge and will our tones. Defective hearing is accordingly a serious handicap. A "good ear," *i.e.,* good tone-judgment, is largely the result of opportunity to hear good voices long enough to set a proper standard. The opposite result is very common. Inability to "keep a tune" appears to be not so much the result of defective hearing as of weak correlation with imagination, memory, and will. Exercise—especially in childhood and through the teens—works wonders.

The Eye.—Reading, *i.e.,* singing guided by the eye, is often hard on the eye. The staff in all its details should be written rather large, and the details should be separated far enough to prevent confusion. The words "set to music" should be near the notes to which they belong. The light should be good, and the exercise should cease when eye-fatigue begins.

The Physical Act of Singing.—(1) Unfortunate physical conformations are to be deplored. (2) Obstructions in the nares or throat should be discovered and removed. (3) Strain upon the vocal cords and the walls of the throat should never be permitted. (4) The mouth and the throat should be freely open. All constriction is serious to the health of the parts involved and the musical effects. (5) The posture of the body should be upright, and the breathing from the diaphragm. (6) The air to be breathed should be warm but not depleted of its natural moisture. Cold contracts the vocal muscles; dryness inflames the pharynx by friction.

Courses in Singing

Genetic adjustment is of first importance. The pleasure of the pupil, as we know, is most commonly the key to ability and ripeness. Genetic adjustment should, however, not overlook the importance of music as a moral means and as stimulus in many studies.

Course for Beginners.—(1) The average child, as teachers know, is very fond of nature songs, especially when these are suited to the seasons. (2) In the grammar grades child-life folk-songs become intensely interesting. (3) The child discovers very early in his course that the staff is a mental help of considerable value, and commonly enjoys the work when correlated with the singing in the concrete.

WORK.—(1) The course for beginners in singing should begin with simpler melodies in nature songs suited to the seasons and combined with nature study. It is in this course that the knowing teacher must strive to cumulate apperceptive materials for tone-work and notation. (2) The tone-work should begin with the substitution of "sol-fa" syllables for words in melodies, but without resorting to the staff for half a year or more. Reference to voice-perfections, proper breathing, and the like, must accompany and constitute a part of the word and sol-fa melodies. (3) Skilfully handled, the average class will be ready for the staff before the close of the first year; it will stand for something already experienced. Movable "do," and "interval" or jumping exercises, should become frequent in the second year. The third and fourth year should lay stress on 2–4, 3–4, and 4–4 time. At the close of the fourth year the class should know the names of the notes, the pitch-names, and a number of important staff symbols. Two-part songs and "rounds" may be introduced. (4) Listening lessons and distinguishable interval exercises for monotones, if there should be such, must of course begin as soon as possible. (5) Considerable fluency in sight-reading of simpler songs is not too high an aim for the last grammar school year.

The Tufts Normal charts and music readers are an admirable outline of the course proposed.

Intermediate Course.—(1) The intermediate course should promote school happiness; (2) it should help to build the personality of boys and girls in years full of possibility for good and evil; (3) it should be brought into close relation with the other branches of the school curriculum, thus redeeming these from the emotional distance which so often alienates the boys and girls from school too soon; and (4) the course should help the boys and girls who cannot go to the high school to make their homes and friends so much happier, to love their country, and to feel at home in religious circles.

WORK.—(1) The folk-songs employed to form the personality of boys and girls must be freighted with ideal thoughts, and sent to the heart through effective tonality and rhythm. These folk-songs should consist of the best "national airs," of the best home and friendship songs, of the noblest heart-songs tending toward holiness and godliness. The nations have vied with each other in producing admirable folk-songs. Among the foremost contributors are Germany, England, Scotland, Poland, Hungary, Bohemia, Russia, etc. Excellent collections of such songs and hymns have lately come to teachers. (2) The exercises in tonality and rhythm should begin to include "intervals" that require more and more control of the vocal organs. Phrasing should be emphasized. The "moving scale" should be brought into play very much. Chromatics and the minor scales should be introduced and pushed. Two-part and three-part singing should be cultivated more and more. The mood-modifying "round" should be used whenever it is best. The monotones still require special care. Note-singing should be coupled with a good deal of tone-thinking and fluent sight-reading. Masters like Handel, Mozart, and Bach may be introduced when the class reaches the threshold of the high school or of life beyond the school-room. All the singing exercises should be made as hygienic as they can be made.

High School Course.—(1) Singing in the high school serves as sweet "relief" from stress and strain of mind. Beyond all this, the course should be planned for the ennoblement of adolescent personality, for richer correlation with the high school curriculum, and for musical power in life.

WORK.—To suit the ends in view the high school course in singing should include the mastery of staff mechanics and sight-reading, coupled with as much work on the masters as time may permit and conditions require.

TEACHING SINGING

The relation of the tasks to the pupil must determine all the methods of instruction.

Methods with Beginners

Preparations for the recitation are as necessary as in other branches.

Preparations.—(1) The beginner in singing cannot be expected to make any preparations. Even the committing of the folk-songs should not be disconnected from the recitation period and its helps by the teacher. (2) The teacher of beginners must select the folk-songs to suit his purposes. He must know both the words and the tune, and think out the steps that he would follow in the classroom.

Recitations with Beginners.—Lessons in rote-singing come first in the course.

ROTE-SINGING.—(1) The first thing to do is to sing the selection for the class. The singing should please the children so much that they will "want to learn it, too." (2) The song must then be broken up into so-called "phrases." These must be mastered one by one in their right succession, the teacher singing them repeatedly, the children repeating what the teacher sings. As soon as it can be safely done pupils must be led to sing alone as well as together. The monotones should be discovered, but they should not be embarrassed. The song to be learned should be sung until the children know it well enough to love it. (3) The song thus learned should have been selected in connection with an interesting nature study lesson, and used afterwards again and again where it fits.

TONE LESSONS.—The tone lessons are to be coupled almost from the beginning with the rote-singing. (1) Good posture must be taught by precept coupled with example. The children should be trained to full-breath singing almost from the start. Thinking of a fragrant rose will help the class much more than technical directions. The teacher should be a pattern of correct enunciation, in which event the class will copy him most startlingly without much direction. A defective copy is always serious.

Staff-work.—The transition from the worded melody of the nature-songs—and folk-songs—learned by rote, to the representing staff with its details is most easily accomplished by humming or ooing the melody. Presently, say toward the close of the first year, the staff should be introduced as an eye-help in tone lessons. Tonality and rhythm must now be attached to symbols that will guide the mind through the eye. Lucid explanations must be coupled with the introduction of all symbols. (2) In singing lessons, as in drawing, it is necessary to make haste slowly, connecting much perfecting practice with each undertaking, but never to the point of fatigue. In this practice work figures, syllables, and sol-fa names should frequently be substituted for each other, thus hastening the transition from the concrete to the abstract, and at the same time interesting the class. Rhythm cards, charts, the blackboard, and readers, serve as interesting helps. (3) All conquests both by mind and voice should be brought into most direct connections with the school-life and the life out of school.

Monotones.—The monotone is not necessarily a hopeless case. As a rule the worst that can be said of the monotone in the lower grades is that he is musically tardy. To help him most we must make him realize his own deficiency without embarrassing him or paralyzing all his hopes. Then we must teach him to believe that he can learn to sing if he will listen much and try hard to sing what we ask him to sing. Instead of asking him to sing up and down the scale from " do to do," we must get him to hear upper do and lower do, and jump from the upper to the lower, and so on by intervals more easily distinguished than one degree of pitch. The earlier results will probably be far from ideal, but if vocal efforts show that he has caught the idea, the teacher may know that his pupil will in time be almost like his classmates. The monotone should be seated where his ear will get the benefit of finer voices, but, to protect his weaker classmates from his disconcerting lead he must be removed as far as possible from them.

Intermediate Methods

The preparations to be made for every recitation are so like the preparations for beginners that we pass them by.

Intermediate Recitations.—(1) The folk-songs for the grammar grades should be correlated with physical culture exercises, with biography and history, and especially with literature. This singing should become a part of the other recitations rather than a long-distance prelude or after-lude. Not only will the lessons with which such singing is associated be the more attractive, but the singing will acquire meaning. (2) The more difficult lessons of the intermediate course in tonality and rhythm must of course be coupled constantly with explanations and illustrations to suit the special cases. Minor scales, chromatics, syncopation, rapid time, etc., are most easily taken up in connection with an organ, but the instrument must never be allowed to weaken mental effort or to take the place of real singing. (3) As a stimulus to musical composition friendly competition may be called into service. The work should usually be done in class, but exceptions to the rule should be allowed.

READING.—(1) When a lyric suited to grammar grades is to be sung, the notes should be sung before the words. Easy pieces like the ones learned through notes should be sung at sight. (2) In the last two years of the grammar school sight-singing should predominate over note-singing followed by the words. When the sight-singing pupil encounters special difficulties note-singing must be called into service. The sight-singing should not crowd note-singing out, for in that event the singer risks too much before he should. Individual singing should be used as tests of self-dependence and cultural accuracy.

High School Methods

High school relations and high school ideals must determine high school methods.

Preparations.—(1) The teacher of high school singing is in so much daily need of larger scholarship, finished art in singing, and in teaching singing, that he dare not take a thing for granted. (2) Tone-thinking lessons and composition tasks may be made requirements of home-work for high school students. The biography of the masters undertaken, or the history of masterpieces, may be assigned for home-work and library reference.

High School Recitations.—The high school recitation must lay much stress on fine technic in voice cultivation. Sight-reading, coupled with biography and history, forms the greater burden of the recitation. The solo, the duet, the trio, or quartette should supplement and relieve the chorus work. Instrumental accompaniments help to perfect the cultural results.

The Value of Singing

Singing rightly taught is a valuable means of culture and a splendid gain to life as life.

Its School Values.—(1) Singing may be so taught as to develop finer faculty for sounds, thus adding immensely to happiness through music. (2) It necessitates an eye and ear conspiracy with imagination, judgment, and will that helps mental growth immensely. (3) Rhythm is Nature's special keyboard to emotion. This makes music a powerful agency in character building and school control. (4) The rhythmic culture of music is a vast gain to poetry. (5) The correct combination of folk-songs with the school curriculum is inspiring.

Life.—(1) Through hygienic singing both the lungs and the vocal organs can be so fortified and perfected as to help them ward off serious attacks of cold and the like. (2) Singing helps to make "home sweet home"; it sweetens friendship; it promotes social heartiness; it fires the heart with patriotic sentiments; it helps the young and the old to feel at home in church; it draws the soul into the very presence chamber of God and the things of God; it is preëminently " the divine art."

The Training of Teachers.—(1) The supervisor of music in the public schools should be able to instruct the grade teachers and point out the way in model lessons with the grades. Her personality should enrich and sanctify her work. Her academic training should, if possible, have had its early course in the grades themselves; the special school should give her the superior scholarship and culture so much needed in her work. The Normal school must point the way in methods. (2) The training of the grade teachers should, and will in time, make the special supervisor quite unnecessary except in cities, and there she will occupy a place somewhat like the place of the supervising principal.

History of Singing

The history of singing begins with the history of man.

National History.—(1) In ancient Egypt and Israel singing was employed as the handmaid of religion, palace-joys, social entertainment, etc. (2) With the beauty-loving Greeks singing was a passion and a fine art. Lyric poetry was extensively produced and sung. They attained to great perfections in the technic of tonality and rhythm. In its content Greek song is patriotic and religious. (3) The Roman sang his war songs, and religious strains, but failed to contribute much. (4) The monastic life emphasized the stately chant. (5) The sixteenth century religious Reformation embodied religious teachings and religious feelings into a multitude of immortal hymns. As a crowning glory of religious fervor it produced most perfect oratorios. (6) The modern nations, chief among them the Germans, are upon the verge of a great revival in the holy art of song.

In the School Curriculum.—(1) All the educational systems of the past paid more or less attention to singing in the schools. The Greek philosophers believed that harmony was the very highest thing in life. (2) The Roman patrician of the Golden Age followed in the steps of Greece. (3) Singing was the queen of the mediæval "seven liberal arts." The knights vied with the monks in their passionate devotion to music. (4) The educational reformers valued singing very much in home-life, church, and school. (5) The foremost nations of modern Europe have not only given singing to the schools for the masses, but they make it compulsory. (6) The day is coming very rapidly when America will follow Europe.

Pedagogical Progress.—(1) For many centuries the school teacher trained in singing and the art of teaching singing was a rarity. (2) The up-to-date city of to-day employs specially trained supervisors, but finds it difficult to secure grade teachers trained well enough to win professional success in teaching singing. (3) The Normal schools are now attempting to train teachers in the art of singing and its pedagogy. The day is rapidly coming when the grade teacher must qualify himself in singing as he does in any other branch of the school curriculum.

Supplementary Reading.

1. N. E. A. Reports: 1904, pages 678–708; 1905, pages 630–668.
2. Painter's History of Education.
3. Compayre's History of Pedagogy.
4. Pedagogical Seminary, April, 1900.

APPENDIX

REFERENCE BOOKS FOR COLLATERAL READING

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REFERENCE BOOKS FOR COLLATERAL READING

Mind

1. The Growth of the Brain. *Donaldson.*
2. The Human Mind and Its Physical Basis. *Deatrick.*
3. Thinking, Feeling, Doing. *Scripture.*
4. Mental Faculty. *Warner.*
5. The New Psychology. *Scripture.*
6. A Primer of Psychology. *Titchener.*
7. Genetic Psychology for Teachers. *Judd.*
8. The Psychology of Thinking. *Miller.*
9. Psychology in Education. *Roark.*
10. The Fundamentals of Child Study. *Kirkpatrick.*
11. The Development of the Child. *Oppenheim.*
12. Adolescence. *Hall.*

Body

1. The Study of Children. *Warner.*
2. The Physical Nature of the Child. *Rowe.*
3. School Hygiene. *Shaw.*
4. School Hygiene. *Kotelman.*
5. The Care of the Child in Health. *Oppenheim.*

Principles of Teaching

1. The Meaning of Education. *Butler.*
2. Education as Adjustment. *O'Shea.*
3. The Educational Process. *Fleshman.*
4. The Educative Process. *Bagley.*
5. The Philosophy of Education. *Horne.*
6. Philosophy of Education. *Rosenkranz.*
7. Education. *Spencer.*
8. Physical Education. *Maclaren.*
9. Moral Training in the Public Schools. Prize Essays.
10. The Principles of Religious Education. *Butler.*
11. Social Phases of Education. *Dutton.*
12. Industrial Education. *Magnus.*
13. Interest in Education. *DeGarmo.*

14. The Child and the Curriculum. *Dewey.*
15. General Method. *McMurry.*
16. The Essentials of Method. *DeGarmo.*
17. Principles of Teaching. *Thorndike.*
18. Common Sense Didactics. *Sabin.*
19. The Recitation. *Hamilton.*

Agriculture

1. Agriculture for Beginners. *Burkett,* etc.
2. The Rural Science Series. *Bailey.*
3. Principles of Soil Management. *Lyon and Fippin.*
4. The Physiology of Plant Production. *Duggar.*
5. A Primer of Forestry. *Pinchot.*
6. Insects Injurious to Fruits. *Saunders.*
7. Fruit Insects. *Slingerland.*
8. Bacteria in Relation to Country Life. *Lipman.*
9. Modern Methods of Sewage Disposal. *Waring.*
10. The Drainage of Habitable Buildings. *Beardmore.*
11. Heating, Lighting, Ventilating.
12. Cyclopedia of American Agriculture. *Bailey.*

Arithmetic

1. Psychology of Number. *Dewey.*
2. The Teaching of Elementary Arithmetic. *Smith.*
3. The Grube Method of Arithmetic. *Seeley.*
4. Number Work in Nature Study. *Jackman.*
5. The Teaching of Mathematics in Secondary Schools. *Young.*
6. The Philosophy of Arithmetic. *Brooks.*
7. Lippincott's Practical Arithmetic.

Composition

1. Language Lessons. *Barnes.*
2. Practical Lessons in Language. *Conklin.*
3. Hand-Book of Punctuation. *Turner.*
4. How to Write English. *Reade.*
5. How to Write Clearly. *Abbott.*
6. Analysis of Letter-Writing. *Townsend.*
7. The Teaching of English. *Carpenter.*
8. Nature of Poetry. *Stedman.*
9. Hand-Book of Poetics. *Gummere.*
10. Primer of English Verse. *Corson.*

11. Shorter History of English Literature. *Saintsbury.*
12. English Poets. *Ward.*
13. English Literature. *Tenbrinks.*
14. Lessons in Language. *Patrick.*

Drawing

1. Practice Books. *Augsburg.*
2. Drawing Books, No. I, II, and III. *Augsburg.*
3. The Parallel Course (4 books).
4. System of Drawing. *White.*
5. Mechanical Drawing. *Cross.*
6. Text Books of Art Education (8 books).
7. Art Education for High Schools.

Geography

1. Special Method in Geography. *McMurry.*
2. Teachers' Manual of Geography. *Frye.*
3. Teachers' Manual of Geography. *Redway.*
4. Brooks and Brook Basins. *Frye.*
5. The Child and Nature. *Frye.*
6. Geographical Studies. *Ritter.*
7. Comparative Geography. *Ritter.*
8. Field, Laboratory, and Library Manual of Physical Geography. *Wright.*
9. How to Study Geography. *Parker.*
10. Lippincott's Gazetteer of the World.

Grammar

1. Essentials of English Grammar. *Whitney.*
2. Principles of English Grammer. *Carpenter.*
3. Grammar Land. *Nesbitt.*
4. The English Language. *Meiklejohn.*
5. History of English. *Champney.*
6. Principles of English Grammar. *Patrick.*
7. Lessons in Grammer. *Patrick.*

History

1. The Teaching of History and Civics. *Bourne.*
2. Special Method in History. *McMurry.*
3. How to Study and Teach History. *Hinsdale.*

4. Method in History. *Mace.*
5. Methods of Teaching and Studying History. *Hall.*
6. Methods of Historical Study. *Freeman.*
7. History of Civilization. *Guizot.*
8. Documentary Source-book of American History. *MacDonald.*
9. The United States as a World Power. *Coolidge.*
10. American Indians. *Starr.*
11. Stories of Pennsylvania. *Brumbaugh.*
12. Two Centuries of Pennsylvania History. *Sharpless.*
13. Historical Tales. *Morris.*
14. "The Government of the United States and of the State of Pennsylvania." *Gruber.*
15. Schwinn & Stevenson's Civil Government.

Manual Training

1. First Lessons in Wood-Working. *Compton.*
2. Elementary Wood-Work. *Kilbon.*
3. Knife Work in the School Room. *Kilbon.*
4. Wood-Work in the Common School. *Hinckley.*
5. The Sloyd System of Wood-Work. *Hoffman.*
6. How to Use Wood-Working Tools. *Whitaker.*
7. Educational Value of Manual Training. *Woodward.*
8. Industrial Instruction. *Seidel.*
9. Beginnings in Industrial Education. *Hanus.*
10. Manual Training. *Ham.*

Mental Culture

1. The Dogma of Formal Discipline. *Hinsdale.*
2. Exercises in Mind Training. *Aiken.*
3. Assimilative Memory. *Loisette.*
4. The Art of Study. *Hinsdale.*
5. Thinking and Learning to Think. *Schaeffer.*
6. Habit in Education. *Radestock.*
7. Self-Culture. *Blackie.*
8. The Making of Character. *MacCunn.*

Object Lessons

1. Child's Book of Nature. *Hooker.*
2. Natural History Object Lessons. *Ricks.*
3. Common Minerals and Rocks. *Crosky.*
4. Color in the School-Room. *Bradley.*

5. Primer of Scientific Knowledge. *Bert.*
6. The Nature-Study Idea. *Bailey.*
7. Nature Study and Life. *Hodge.*
8. Nature Study for Common Schools. *Jackman.*
9. The Teaching of Biology. *Lloyd and Bigelow.*
10. Nature Study and Life. *Hodge.*
11. The Study of Nature. *Schmucker.*
12. Nature Study. *Holtz.*

Physical Culture

1. Physical Culture for the School-Room. *Preece.*
2. Manual of School Gymnastics. *Smart.*
3. Americanized Delsarte Culture. *Bishop.*
4. Seventy Years Young. *Bishop.*
5. Health Lessons. *Walker.*
6. How to Get Strong. *Blaikie.*

Physiology

1. How to Teach Physiology. *Blaisdell.*
2. Hints for Teachers of Physiology. *Bowditch.*
3. Physiology for the Laboratory. *Brown.*
4. The Story of the Bacteria. *Prudden.*
5. Dust and its Dangers. *Prudden.*
6. The Soil in its Relation to Health. *Miers and Crosky.*

Reading

1. The Sentence Method of Teaching Reading. *Farnham.*
2. Rational Method of Reading. *Ward.*
3. Manual of Synthetic Reading. *Pollard.*
4. How to Teach Reading. *Hall.*
5. Special Method in Primary Reading. *McMurry.*
6. Reading as a Fine Art. *Legouve.*
7. Children's Classics in Dramatic Form. *Stevenson.*
8. School Libraries.
9. Mastery of Books. *Koopman.*
10. Worcester's Comprehensive or Academic Dictionary.

Singing

1. Educational Music Course. *Mason.*
2. Normal Course of Music in the School Room. *Lyman.*
3. Teachers' Manual of Music. *Tufts and Holt.*

4. Hand-Book on the Art of Teaching Music. *Warriner.*
5. The Psychology of Singing. *Taylor.*

Spelling

1. Powers' Graded Speller.
2. The Bailey-Manly Spelling Book.
3. Advanced Speller. *Pollard.*
4. Scientific Alphabet. *Van De Venter.*
5. The Orthoepist. *Alfred Ayres.*
6. Spelling in the Elementary School. *Cornman.*

Writing

1. Theory of Penmanship. *Spencer.*
2. Vertical Edition of Spencerian Penmanship.
3. Vertical Penmanship. *Merrill.*
4. How to Teach Writing. *Appleton.*
5. The Business Educator. *Zaner and Bloser.*
6. Handwriting and How to Teach It. *Gordon.*

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